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UNIVERSITY

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UNIVERSITY CATALOG

2015-2016

The Rush University Catalog is published as a guide for the faculty and students of Rush University. The University reserves the right to add, amend, delete or deviate from any specifications herein at any time and to apply such changes to registered and accepted students. Policies as stated in the Catalog supersede policies in departmental student handbooks. Students are responsible for reading the Catalog and acquainting themselves with the University policies and regulations to which they are required to adhere. Additionally, students are responsible for knowing the degree requirements relevant to their majors and for enrolling in the courses satisfying those requirements.

Rush University believes the information contained herein is accurate as of August 30, 2015.



University Catalog 2015-2016

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2015-2016 Academic Calendar

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health Sciences	The Graduate College	College of Nursing
Fall 2015							
Registration Begins	7/13/2015	7/13/2015	3/2/2015		7/20/2015	7/20/2015	7/20/2015
Registration Ends	7/24/2015	7/24/2015	3/13/2015		7/31/2015	7/31/2015	7/31/2015
Start	8/10/2015	8/3/2015	5/11/2015	5/11/2015	9/14/2015	8/31/2015	8/31/2015
Labor Day Holiday	9/7/2015	9/7/2015	9/7/2015	9/7/2015		9/7/2015	9/7/2015
Thanksgiving Break	11/21-11/29/2015	11/21-11/29/2015				11/26-11/29/2015	11/26-11/27/2015
Classes End					11/20/2015	12/11/2015	12/11/2015
Final Exams	12/11-12/14/2015				11/23-11/25/2015	12/14-12/18/2015	*see notes
End	12/14/2015	11/21/2015	10/23/2015	10/23/2015	11/25/2015, 12/11/2015, or 12/18/2015 (depending on program)	12/18/2015	12/11/2015
Graduation					12/19/2015	12/19/2015	12/19/2015
Christmas Holiday	12/25/2015	12/25/2015	12/25/2015	12/25/2015	12/25/2015	12/25/2015	12/25/2015

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health Sciences	The Graduate College	College of Nursing
Winter 2016							
New Year's Holiday					1/1/2016		
Registration Begins					10/26/2015		
Registration Ends					11/6/2015		
Start					1/4/2016		
MLK Holiday					1/18/2016		
Classes End					3/11/2016		
Final Exams					3/14-3/18/2016		
End					3/18/2016		
Graduation					3/19/2016		

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health Sciences	The Graduate College	College of Nursing
Spring 2016							
New Year's Holiday	1/1/2016	1/1/2016	1/1/2016	1/1/2016		1/1/2016	1/1/2016
Registration Begins	10/26/2015	10/26/2015	8/24/2015		2/29/2016	10/26/2015	10/26/2015
Registration Ends	11/6/2015	11/6/2015	9/4/2015		3/11/2016	11/6/2015	11/6/2015
Start	1/4/2016	11/30/2015	10/26/2015	10/26/2015	3/28/2016	1/4/2016	1/4/2016
Thanksgiving Break							
MLK Holiday	1/18/2016	1/18/2016				1/18/2016	1/18/2016
Term Break	3/26-4/3/2016	12/19/2015-1/3/2016	12/21/2015-1/3/2016	12/21/2015-1/3/2016	3/19-3/27/2016	3/12-3/20/2016	
Classes End					6/3/2016	5/6/2016	4/15/2016
Final Exams	5/16-5/18/2016	3/14-3/16/2016			6/6-6/10/2016	5/9-5/13/2016	*see notes
End	5/20/2016	3/18/2016	4/22/2016	4/22/2016	6/10/2016	5/13/2016	4/15/2016
Graduation				5/26/2016	6/11/2016	5/26/2016	4/16/2016
Commencement				5/26/2016	5/26/2016	5/26/2016	5/26/2016

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health Sciences	The Graduate College	College of Nursing
Summer 2016							
Registration Begins					4/18/2016	2/29/2016	2/29/2016
Registration Ends					4/29/2016	3/11/2016	3/11/2016
Start					6/20/2016	5/16/2016	5/2/2016
Memorial Day						5/30/2016	5/30/2016
Independence Day					7/4/2016	7/4/2016	7/4/2016
Classes End					8/26/2016	8/19/2016	8/12/2016
Final Exams					8/29-9/2/2016		*see notes
End					9/2/2016	8/19/2016	8/12/2016
Graduation					9/3/2016	8/20/2016	8/20/2016

*Notes: Not all classes in the College of Nursing have final exams. Please consult the individual course syllabi for details. Nursing students should plan to be available for coursework and/or exams until the official end date of each term. ***Calendar dates are subject to change without notice.***

Degree and Certificate Programs

Rush Medical College

Doctor of Medicine

Rush University College of Nursing

Master of Science in Nursing

Post-Graduate Certificate

Doctor of Nursing Practice

Doctor of Philosophy

College of Health Sciences

Bachelor of Science

Health Sciences

Imaging Sciences

Medical Laboratory Science

Perfusion Technology

Respiratory Care

Vascular Ultrasound and Technology

Certificate

Specialist in Blood Bank

Master of Science

Clinical Laboratory Management

Clinical Nutrition

Health Systems Management

Medical Laboratory Science

Medical Physics

Occupational Therapy

Perfusion Technology

Physician Assistant Studies

Research Administration

Respiratory Care

Speech-Language Pathology

Doctor of Audiology

Doctor of Philosophy

The Graduate College

Master of Science

Anatomy and Cell Biology

Biochemistry

Biomechanics

Biotechnology

Clinical Research

Immunology/Microbiology

Medical Physics

Pharmacology

Doctor of Philosophy

Anatomy and Cell Biology

Biochemistry

Biomechanics

Health Sciences

Immunology/Microbiology

Integrated Biomedical Sciences

Medical Physics

Molecular Biophysics and Physiology

Neuroscience

Nursing Science

Pharmacology

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Perry R. Pero

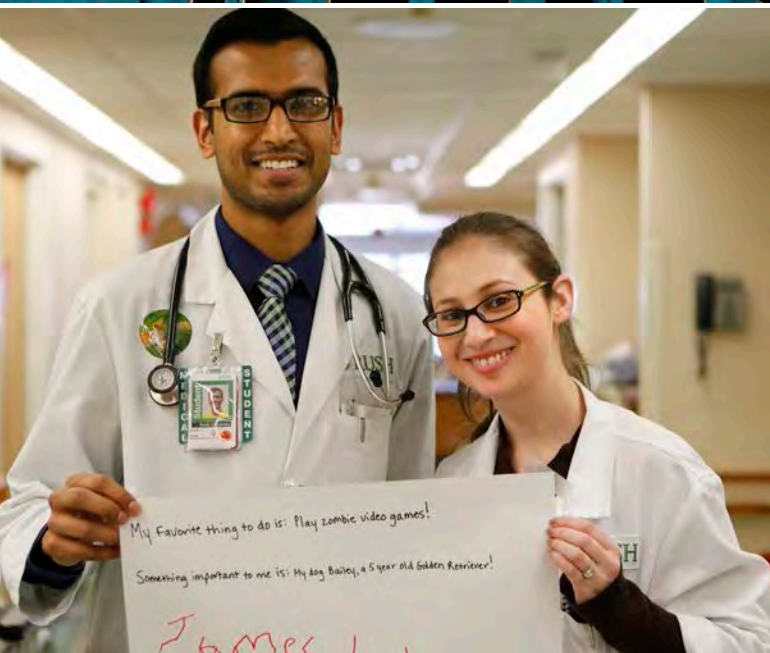
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Welcome to Rush University!



Rush University is dedicated to training in the clinical and basic sciences of health care and medical research. Its four colleges — Rush Medical College, Rush University College of Nursing, the College of Health Sciences and the Graduate College — together train over 2,100 students. In addition, Rush University Medical Center trains over 600 residents and fellows in the graduate programs of clinical education for physicians. The desire to participate in the education of trainees at all levels has attracted some of the most outstanding scientists, physicians, nurses and allied health professionals in the country to Rush. Our primary interest at the Medical Center is to provide the very best in patient care. Trainees in the clinical disciplines will be prepared for the challenges that they will face by active participation in clinical care throughout most of their training. Basic scientists will work as part of those teams, and understand the immediate relevancy of their work. The many linkages of basic science programs with clinical ones often stimulate each side to find creative solutions to important problems.

Rush University Medical Center is one of the nation's leading academic health centers. I am pleased you have chosen Rush for your training. We take the responsibility seriously. At any time during your training, please feel free to contact one of your Deans or me for any suggestions or to address any issues. Training is exciting as well as challenging. All of us are here to support you.

Thanks for choosing Rush.

A handwritten signature in black ink that reads "Larry Goodman". The signature is written in a cursive, flowing style.

Larry Goodman, MD
President, Rush University
Chief Executive Officer, Rush University Medical Center

Rush University Medical Center Mission, Vision and Values

Mission

The mission of Rush is to provide the best health care for the individuals and diverse communities we serve through the integration of outstanding patient care, education, research, and community partnerships.

Vision

Rush will be the leading academic health system in the region and nationally recognized for transforming health care.

Core Values

"I CARE"

Innovation

Collaboration

Accountability

Respect

Excellence

History of Rush University Medical Center

Rush University Medical Center is one of Chicago's oldest health care organizations. Its heritage extends back to 1837, when Rush Medical College was established. St. Luke's Hospital, founded in 1864, and Presbyterian Hospital, founded in 1883, merged in 1956 to form Presbyterian-St. Luke's Hospital. The subsequent incorporation of these pioneer institutions in 1969 created Rush-Presbyterian-St. Luke's Medical Center, which was renamed Rush University Medical Center in October 2003.

Rush is a not-for-profit academic medical center comprising Rush University Medical Center, Rush University, Rush Oak Park Hospital and Rush Health.

Renowned Patient Care

Rush University Medical Center encompasses a 664-bed hospital serving adults and children, including the Johnston R. Bowman Health Center, which provides medical and rehabilitative care to older adults and people with short- and long-term disabilities.

It includes Rush's 376-bed Tower hospital building, which opened in 2012 as part of the Medical Center's major campus renovation. Rush's commitment to sustainability innovation

earned the Tower LEED Gold certification. It is the largest new construction health care project in the world to be LEED Gold certified. Rush's renovation also includes Rush's Orthopedic Building, which opened in 2010, and the ongoing campus-wide implementation of an electronic medical record system, enhancing patient care and safety.

A unique combination of research and patient care has earned Rush national rankings in 9 of 16 specialty areas in *U.S. News & World Report's* 2013–14 America's Best Hospitals issue, among other recognitions of our quality of care and accreditations. Our nurses are at the forefront of our efforts to provide quality care, receiving Magnet status three times for making outstanding nursing care the standard at the Medical Center. Rush was the first hospital in Illinois serving adults and children to receive Magnet status — the highest honor in nursing — and the first in Illinois to earn a third four-year designation.

And some of the world's best athletes trust themselves to the hands of our physicians. Rush is proud to be the preferred hospital for the Chicago Bulls.

Educating Future Health Care Providers

Rush University is home to one of the first medical colleges in the Midwest and one of the nation's top-ranked nursing colleges, as well as graduate programs in allied health, health systems management and biomedical research. The Medical Center also offers many highly selective residency and fellowship programs in medical and surgical specialties and subspecialties. Rush's unique practitioner-teacher model for health sciences education and research gives students the opportunity to learn from world-renowned instructors who practice what they teach.

Committed to Community

In addition to patient care, education and research, Rush maintains a strong commitment to the community. Many students, faculty and staff at Rush generously donate their time and skills both within and outside of the Medical Center. Their efforts include numerous health outreach projects in which Rush collaborates with neighborhood clinics, churches, schools and other organizations to provide health screenings and vital health information for underserved children and adults.

Our education and research endeavors, community service programs and relationships with other hospitals are dedicated to enhancing excellence in patient care for the diverse communities of the Chicago area — now and in the future.

Larry J. Goodman, MD, is CEO of Rush University Medical Center and President of Rush University. He also serves as president of the Rush System for Health, and he is the principal officer of the Rush Board of Trustees.

Rush University Mission, Vision and Values

Mission

Rush University provides outstanding health sciences education and conducts impactful research in a culture of inclusion, focused on the promotion and preservation of the health and well being of our diverse communities.

Vision

The Rush learning community will be the leading health sciences university committed to transforming health care through innovative research and education.

Core Values

As the academic component of Rush University Medical Center, the University shares the Medical Center's core values: innovation, collaboration, accountability, respect and excellence. These I CARE values guide the efforts of Rush University students, faculty and researchers

History of Rush University

Rush University is the academic component of Rush University Medical Center. Founded in 1972, the University has expanded from one college and fewer than 100 students to four colleges and over 2,100 students. It includes Rush Medical College, Rush University College of Nursing, the College of Health Sciences and the Graduate College.

Rush Medical College is named for Benjamin Rush, a physician from Pennsylvania, who also signed the Declaration of Independence. Rush Medical College was chartered in 1837 and opened officially on December 4, 1843, with 22 students enrolled in a 16-week course. During the first century of operation, more than 10,000 physicians received their training at Rush Medical College. Rush Medical College was affiliated with the University of Chicago from 1898 until 1942, when the medical college temporarily suspended its educational program,

though it continued its corporate existence. Its faculty continued undergraduate and graduate teaching of medicine and the biological sciences as members of the faculty of the University of Illinois. The charter of the medical college was reactivated in 1969 when it became part of the Medical Center. Rush Medical College reopened in 1971 with a class of 66 first-year students and 33 third-year students. First-year class size reached its projected maximum of 120 in 1976.

Rush University College of Nursing represents a combined heritage dating back to the late nineteenth century when its first antecedent, the St. Luke's Hospital School of Nursing, opened in 1885 to offer diploma education to nurses. In 1903, the Presbyterian Hospital School of Nursing accepted its first students. From 1956 to 1968 nurses were taught at the merged Presbyterian-St. Luke's Hospital School of Nursing. Before the establishment of the College of Nursing in 1972, more than 7,000 nurses had graduated from these three schools.

The **College of Health Sciences**, established in 1975, traces its origins to the School of Medical Technology sponsored by Presbyterian-St. Luke's Hospital from 1959 to 1972. This school was the second largest of its kind in the city of Chicago. During its operation, it provided a one-year professional internship program to more than 200 baccalaureate students in medical technology. Today, the College of Health Sciences offers doctoral programs in audiology and health sciences, ten programs at the master's level, and bachelor's programs in health sciences, imaging sciences, medical laboratory science, perfusion technology, respiratory care and vascular ultrasound technology.

The **Graduate College** was established as a separate academic unit in January 1981, having previously been organized as the Graduate School within the College of Health Sciences. The Graduate College is responsible for educational programs in the basic sciences and offers master's and doctoral degrees in twelve disciplines.

The Seal of Rush University

The seal of Rush University is a shield, a classic Greek symbol of preservation and protection and also a medieval British emblem used for identification. As such, it recognizes the University's overarching commitment to educating health professionals who preserve life and protect patients, and it is the distinguishing identification of Rush University. Its two colors, green and gold, merge the tradition of the past with the custom of the present as gold was the single historical color of Rush Medical College and green is used for the modern Medical Center.



The motto, *ministrare per scientiam*, translated from Latin, means to minister (care for or serve) through scientific knowledge. It was adopted by the Board of Trustees in September 1993 to reflect the commitment to educate caring professionals whose practice is based in knowledge. The shadow in the background is the anchor cross, a symbol of hope and steadfastness, which became the emblem of the merged Presbyterian and St. Luke’s

hospitals in 1957 and the foundation that created the vision for Rush University. Superimposed on top is the stylized version of the anchor cross that was adopted in 1971 upon the merger of Rush Medical College and Presbyterian-St. Luke’s Hospital. The final elements are Chicago, the city that is home to the University, and the date of the University’s founding, 1972. The Rush University Board of Overseers adopted the seal in 1999.

Student Characteristics

Statistics below are based on Fall 2014 enrollment figures.

Fall 2014 Enrollment	Men	Women	Total
Rush Medical College	253	257	510
College of Nursing	120	929	1049
College of Health Sciences	175	500	675
The Graduate College	112	111	223
Grand Total			2,457

Students by Race and Ethnicity	Total
American Indian or Alaska Native	6
Asian	337
Black or African American	159
Hispanic	128
Native Hawaiian or Other Pacific Islanders	3
White	1,645
Two or More Races	29
Unknown	82
Grand Total	2,457

Student Financial Aid Data	%
Title IV Aid Recipients (total student body):	56%
Pell Grant Recipients (undergraduates only):	35%

Accreditation, Authorization and Licenses

Rush University

Higher Learning Commission of the North Central
Association of Colleges and Schools
230 S. LaSalle St., Suite 7-500
Chicago, IL 60604
(800) 621-7440
<http://www.hlcommission.org>

Rush Medical College

Accreditation Council for Continuing Medical
Education (ACCME)
515 N. State St., Suite 1801
Chicago, IL 60654
(312) 527-9200
<http://www.accme.org>

Accreditation Council of Graduate Medical Education (ACGME)

515 N. State St., Suite 2000
Chicago, IL 60654
(312) 755-5000
<http://www.acgme.org>

American Medical Association (AMA)

330 N. Wabash Ave.
Chicago, IL 60611
(800) 621-8335
<http://www.ama-assn.org>

Association of American Medical Colleges (AAMC)

655 K Street NW, Suite 100
Washington, DC 20001
(202) 828-0400
<http://www.aamc.org>

Liaison Committee on Medical Education (LCME)

655 K Street, NW, Suite 100
Washington, DC 20001
(202) 828-0596
<http://www.lcme.org>

College of Nursing

Commission on Collegiate Nursing Education (CCNE)
One DuPont Circle NW, Suite 530
Washington, DC 20036
(202) 463-6930
<http://www.aacn.nche.edu/Accreditation>

Council on Accreditation of Nurse Anesthesia
Educational Programs
222 Prospect Ave., Suite 304
Park Ridge, IL 60068
(847) 655-1160
<http://home.coa.us.com>

College of Health Sciences

Department of Clinical Nutrition

Academy of Nutrition and Dietetics
Accreditation Council for Education in Nutrition and Dietetics
(ACEND).
120 South Riverside Plaza, Suite 2000
Chicago, IL 60606-6995
(312) 899-0040 ext. 5400
<http://www.eatrightacend.org>

Department of Communication Disorders and Sciences

Council on Academic Accreditation in Audiology and Speech-
Language Pathology (CAA)
American Speech-Language-Hearing Association
2200 Research Blvd., Suite
Rockville, MD 20850-3289
(800) 498-2071
http://www.asha.org/academic/accreditation/CAA_overview.htm

Department of Health Systems Management

Commission on Accreditation of Healthcare Management
Education (CAHME)
1700 Rockville Pike, Suite 400
Rockville, MD 20852
(301) 998-6101
<http://www.cahme.org>

Department of Medical Laboratory Science

BS and MS programs:

National Accrediting Agency for Clinical Laboratory
Sciences (NAACLS)
5600 N. River Rd., Suite 720
Rosemont, IL 60018-5119
(773) 714-8880
Fax: (773) 714-8886
<http://www.naacls.org>

Specialist in Blood Bank certificate program:

Commission on Accreditation of Allied Health Education Programs (CAAHEP)
1361 Park St.
Clearwater, FL 33756
(727) 210-2350
Fax: (727) 210-2354
<http://www.caahep.org>

Department of Medical Physics

Commission on Accreditation of Medical Physics Education Programs, Inc. (CAMPEP)
One Physics Ellipse
College Park, MD 20740
(301) 209-3346
Fax: (301) 209-0862
<http://www.campep.org>

Department of Occupational Therapy

Accreditation Council for Occupational Therapy Education (ACOTE)
c/o Accreditation Department
American Occupational Therapy Association (AOTA)
4720 Montgomery Lane, Suite 200
Bethesda, MD 20814-3449
(301) 652-6611
Fax: (240) 762-5150
<http://www.acoteonline.org>

Perfusion Technology

Accreditation Committee – Perfusion Education
(A committee on accreditation for CAAHEP)
6663 S. Sycamore St.
Littleton, CO 80120
(303) 794-6283
Fax: (303) 738-3223
<http://www.ac-pe.org>

Physician Assistant Studies

Accreditation Review Commission on Education for the Physician Assistant, Inc (ARC-PA)
12000 Findley Rd., Suite 150
Johns Creek, GA 30097
(770) 476-1224
Fax: (770) 476-1738
<http://www.arc-pa.org>

Department of Religion, Health and Human Values

Association for Clinical Pastoral Education, Inc. (ACPE)
One West Court Square, Suite 325
Decatur, GA 30030
(404) 320-1472
Fax: (404) 320-0849
<http://www.acpe.edu>

Department of Respiratory Care

Commission on Accreditation for Respiratory Care (CoARC)
1248 Harwood Rd.
Bedford, TX 76021-4244
(817) 283-2835
Fax: (817) 354-8519
<http://www.coarc.com>

Department of Vascular Ultrasound and Technology

Joint Review Committee on Education in Diagnostic Medical Sonography (JRCEDMS)
(A committee on accreditation for CAAHEP)
6021 University Blvd., Suite 500
Ellicott City, MD 21043
(443) 973-3251
Fax: (866) 738-3444
<http://www.jrcdms.org>

Authorization

The Illinois Board of Higher Education has authorized all degree programs offered through Rush University.

Illinois Board of Higher Education

1 N. Old State Capitol Plaza, Suite 333
Springfield, IL 62701-1377
(217) 782-2551
Fax: (217) 782-8548
<http://www.ibhe.state.il.us>

Additional State Authorizations

This institution is authorized by:

The Indiana Board for Proprietary Education
101 W. Ohio St., Suite 670
Indianapolis, IN 46204-1984

Licenses

State of Illinois
Department of Public Health
Cook County Board of Health

Rush University Medical Center Memberships

Rush University Medical Center belongs to the following organizations:

Association of American Medical Colleges
American Association of Colleges of Nursing
Federation of Independent Illinois Colleges and Universities
Association of Schools of Allied Health Professions
Association of University Programs in Health Administration
National League for Nursing
Association for Health Services Research
American Hospital Association
Illinois Hospital Association
Voluntary Hospitals of America
Metropolitan Chicago Health Care Council
Blue Cross/Blue Shield Health Care Service Corp.
Council of Graduate Schools
Midwestern Association of Graduate Schools
Illinois Association of Graduate Schools
Association for Clinical Pastoral Education
Association of Bioethics Program Directors
Council of Academic Programs in Communication Disorders and Sciences
Interuniversity Consortium for Political and Social Science
Physician Assistant Education Association
Illinois Academy of Physician Assistants
American Academy of Physician Assistants

Rush University Affiliated Colleges and Universities

The following 22 colleges and universities in four states have programs that are affiliated with one or more academic programs at Rush University:

Benedictine University, Lisle, IL
Benedictine University, Springfield, IL
Carleton College, Northfield, MN
Carthage College, Kenosha, WI
Concordia University, River Forest, IL
Cornell College, Mount Vernon, IA
DePaul University, Chicago, IL

Dominican University, River Forest, IL
Hebrew Theological College, Skokie, IL
Illinois College, Jacksonville, IL
Knox College, Galesburg, IL
Lake Forest College, Lake Forest, IL
Lawrence University, Appleton, WI
Lewis University, Romeoville, IL
Macalester College, St. Paul, MN
Monmouth College, Monmouth, IL
North Central College, Naperville, IL
Northeastern Illinois University, Chicago, IL
Ripon College, Ripon, WI
Roosevelt University, Chicago, IL
Spelman College, Atlanta, GA
Wheaton College, Wheaton, IL

Alumni Relations

The Office of Alumni Relations is located in the Triangle Office Building, Suite 250, at 1700 W. Van Buren St. Alumni Relations provides a planned, coordinated program of service and activities of mutual interest and benefit to Rush University, the Medical Center and all alumni. Although the legacy of a Rush education dates back to 1837, Rush University is a relatively young institution. Since the University's inception in 1972, it has conferred more than 18,000 degrees in the health professions. The objective of the Office of Alumni Relations is to provide channels for Rush Medical College, Rush University College of Nursing, the College of Health Sciences, the Graduate College and our predecessor school alumni as well as former Medical Center house staff to stay connected to Rush as follows:

- Remain informed of current developments at the Medical Center
- Develop an active interest in and involvement with their alma mater
- Maintain contact with fellow alumni and faculty
- Take advantage of continuing education opportunities offered through Rush University
- Respond positively through both financial and philosophical support
- Promote and perpetuate the high standards of excellence in patient care, education and scientific advancement consistent with the objectives of Rush University Medical Center

At this time, the following formally organized active alumni associations exist for Rush University graduates:

- The Rush Medical College Alumni Association
- The Rush-Presbyterian-St. Luke's Nurses Alumni Association
- Rush University Communication Disorders and Sciences Alumni Association
- Rush University Health Systems Management Alumni Association (HSMAA)
- Rush University Occupational Therapy Alumni Association
- Alumni Association of the Graduate College at Rush University
- Rush Surgical Society (Alumni Association for Rush-Trained Surgeons)
- Medical Society (Rush Internal Medicine Alumni Association)

For more information concerning Rush University alumni associations, programs and events, contact the Office of Alumni Relations at (312) 942-2569 or alumni@rush.edu or visit the alumni websites at www.rushu.rush.edu/alumni.

Drug Free Campus and Workplace

Rush University Medical Center is committed to achieving and maintaining a drug-free campus and workplace. The Medical Center has established a drug-free policy consistent with its commitment and goals. The policy states in part:

The illegal manufacture, distribution, dispensing, use, sale and/or possession of controlled substances on Medical Center property or while performing Medical Center business is strictly prohibited. An employee or student engaged in any such conduct will be subject to discipline up to and including expulsion or termination. In addition, students and employees are subject to all applicable criminal penalties under local, state or federal law for unlawful possession or distribution of illicit drugs and alcohol. Within five days of the conviction, employees and students must report to the Medical Center any conviction for violation of a criminal drug statute occurring within the Medical Center. The health risks associated with the use of illicit drugs and the abuse of alcohol are many and varied. Some drugs may cause psychological and physical dependence or addiction. Others attack the central nervous system, making the user dangerous to himself and others. In the extreme, they can result in convulsions, psychosis, coma and possible death.

Tobacco-Free Work Environment

Rush University Medical Center supports the surgeon general's report on use of tobacco products as a major cause of preventable death. Tobacco use has been documented to contribute significantly to health problems of those who engage in the practice, and those who are subjected to an environment where smoke is present.

Rush University Medical Center, to be consistent with its mission, seeks to promote the health, safety and quality of life of all people who come to the Rush Campus.

1. In accordance with these standards, Rush University Medical Center prohibits smoking or the use of tobacco by all employees, patients, visitors, physicians, students, faculty, volunteers and contractors on the Medical Center campuses.
2. Regarding premises outside Rush University Medical Center campuses, smoking or the use of tobacco is prohibited in all other buildings or on grounds owned, leased, or controlled by Rush University Medical Center wherever located, including adjacent public sidewalks and adjoining properties. This policy may be limited by the policies of the landlord or 3rd party tenants of such premises.
3. Smoking or tobacco use is prohibited in Rush University Medical Center owned, leased, or controlled vehicles wherever located.
4. Smoking or tobacco use is prohibited within 15 feet of all Rush shuttle bus stops, immediately adjacent to Rush University Medical Center campuses.
5. Signs are posted at each entrance indicating Rush University Medical Center is a tobacco-free environment.
6. Potential new hires will be informed of the tobacco-free work environment at the time of employment application.
7. Current tobacco use will be asked at time of health screening. Those with a positive history will be given referral information for smoking cessation.
8. The tobacco-free work environment and policy will be reviewed at new employee orientation.
9. While this policy does not require employees to quit tobacco use, Rush University Medical Center supports and encourages all efforts by employees to quit tobacco use.
10. The Medical Center offers smoking cessation and coping programs to employees and encourages them to participate. For more information, please contact ChooseHealth@rush.edu or (312) 942-7479.

11. It is the responsibility of all Medical Center staff, faculty, students and employees to ensure compliance with this policy. Enforcement of this policy is a shared responsibility of all hospital personnel.
12. Employees violating this policy will be subject to disciplinary action (see Human Resources Policy and Procedure Code of Conduct).

Diversity, Equal Opportunity and Inclusion

For over three decades, the Rush approach to equal opportunity, diversity and inclusion has not wavered. Our approach is that these are essential components of the best employment, educational and health care practices and must be furthered. This is a continuation of a policy that emanated from the hospital charters of 1865 and 1883 and the documents governing the establishment of Rush University in 1972.

In certain instances, the implementation of this policy and our goals in this area require the use of affirmative initiatives. At Rush, these initiatives are focused on strong recruitment, development and retention efforts, not on quotas — and these recruitment and programming efforts will be continued, consistent with federal, state and municipal guidelines.

Rush University is committed to attracting students who will enable the student body to achieve the educational benefits of diversity and to providing services to all students, faculty and other employees on a nondiscriminatory, equitable basis.

Discrimination or harassment against any member of the Rush University Medical Center community because of age, ancestry, color, disability as defined by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, gender, gender identity and/or expression, marital or parental status, national origin, pregnancy, race, religion, sexual orientation, veteran's status or any other category protected by federal or state law is prohibited and will not be tolerated, nor will any person for those reasons be excluded from the participation in or denied the benefits of any program or activity within Rush University.

Shanon Shumpert, Director of Employee Relations and Equal Employment Opportunity Officer, has been designated to oversee the implementation of this policy for Rush University. Ms. Shumpert can be contacted by telephone at (312) 942-5239 or via email at Shanon_Shumpert@rush.edu.

Additional resources may be found in Human Resources along with the following university individuals/offices:

LeManuel Lee Bitsoi, EdM, EdD
Director, Student Diversity and Multicultural Affairs
Armour Academic Center 984B
(312) 942-0725
lee_bitsoi@rush.edu

Paula J. Brown, MBA
Manager, Equal Opportunity Programs
Rush University Medical Center
Professional Building 128
(312) 942-7094
Paula_J_Brown@rush.edu

Disability Rights

Rush University provides reasonable accommodations to all students on a nondiscriminatory basis consistent with legal requirements as outlined in the Americans with Disabilities Act (ADA) of 1990 and the Rehabilitation Act of 1973 and applicable implementing regulations of these statutes. A reasonable accommodation is a modification or adjustment to an instructional activity, facility, program or service that enables a qualified student with a disability to have an equal opportunity to participate in all Rush University student activities.

To be eligible for accommodations, a student must have a documented disability as defined by the ADA and Section 504 of the Rehabilitation Act of 1973. Both the ADA and Section 504 define disability as (a) a physical or mental impairment that substantially limits one or more major life activities of such individual; (b) a record of such impairment; or (c) being regarded as having such a condition. For information to request accommodation(s), please contact your college representative listed below. Please do not make requests for accommodation(s) to individual faculty members, lecturers or course directors.

In keeping with its goal to promote diversity among its student population, Rush University is committed to attracting and educating students who will help to make the population of health care professionals representative of the national population, including students with disabilities. In addition, Rush University wishes to ensure that access to its facilities, programs and services is available to students with disabilities. The University provides reasonable accommodations to all students on a nondiscriminatory basis consistent with legal requirements as outlined in the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments Act of 2008, and the Rehabilitation Act of 1973.

Rush University Student Disability Assessment Team (RUSDAT)

Rush Medical College – Paul Severin, MD
(312) 942-6194 • Paul_J_Severin@rush.edu

College of Nursing – Sarah H. Ailey, PhD, RN, PHCNS-SC
(312) 942-3383 • Sarah_H_Ailey@rush.edu

College of Health Sciences – Joanne Schupbach, MS, MA
(312) 942-3676 • Joanne_E_Schupbach@rush.edu

The Graduate College – James M. Williams, PhD
(312) 942-3598 • James_M_Williams@rush.edu

Office of the Associate Provost Student Affairs –
Gayle B. Ward, JD
(312) 942-2819 • Rebecca_K_Galicia@rush.edu

For disability-related assistance, questions, or concerns, contact:

Paula J. Brown, Manager
Equal Opportunity Programs
Office for Equal Opportunity
Rush University Medical Center
1725 W. Harrison St., Suite 128
Chicago, IL 60612
(312) 942-7094
Fax: (312) 942-4283
Paula_J_Brown@rush.edu

Harassment: Policies and Procedures

The Policies and Procedures on Sexual and Other Harassment for the University and nonacademic sectors of the institution are intended to increase the awareness of Rush's long-standing commitment to preventing harassment and to focus on the internal resolution of any complaints. Under these policies and procedures, the more familiar category of sexual harassment as well as harassment related to age, ancestry, color, disability as defined by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, gender, gender identity and/or expression, marital or parental status, national origin, pregnancy, race, religion, sexual orientation, veteran's status, or any other category protected by federal or state law is prohibited. The provisions include protections for and prohibit retaliation against an individual making a complaint or supplying information about a complaint. They also incorporate protections for a person who considers himself or herself accused in bad faith. While all administrators and supervisors have responsibility under this document,

certain people have been specifically designated to deal with concerns and complaints that might come forward.

Inquiries or complaints of harassment from students, residents, or faculty members will be handled through the Office for Equal Opportunity by contacting Paula J. Brown, Manager, Equal Opportunity Programs, at (312) 942-7094, by mail (Professional Building 128), or via email at Paula_J_Brown@rush.edu.

Copies of the Policies and Procedures are available from the Office for Equal Opportunity and are on the Rush intranet

Office of Institutional Research, Assessment and Accreditation

The Office of Institutional Research, Assessment and Accreditation (OIRAA) serves Rush University by providing accurate and reliable data in support of planning, policy making, academic assessment and program reviews, in accordance with the institution's mission and strategic goals. The OIRAA fulfills its mission by:

- Providing comprehensive information to support institutional planning, policy formation, decision-making and evaluation of effectiveness
- Coordinating responses to external accountability mandates and a wide range of internal and external requests for information about the University
- Coordinating campus-wide and unit-level assessment of academic programs and administrative processes to support the University's quality improvement efforts
- Providing evidence of institutional effectiveness

The office provides services in three major areas:

External Reporting

The OIRAA has primary responsibility for preparing and submitting official reports and data files to ensure the University's compliance with state and federal reporting mandates. In addition, the office coordinates the University's response to a variety of other external requests for information that are received from internal and external stakeholders. Mandatory external reports and updates:

- Integrated Postsecondary Education Data System (IPEDS)
- Illinois Longitudinal Data System (ILDS)
- Higher Learning Commission Annual Institutional Data Update (HLC/AIDU)
- Illinois Virtual Campus (IVC)
- Illinois Board of Higher Education (IBHE)

Planning Support and Internal Reports

The OIRAA is charged with compiling, analyzing and interpreting statistical data used in strategic planning efforts by University administrators, trustees and committees. These data include:

- Student and faculty characteristics
- Enrollment
- Admissions
- Retention and graduation rates
- Degrees awarded
- Credit hour production
- Alumni performance
- Scholarship/research productivity
- Strategic planning and institutional performance metrics

The information is disseminated to the University community through annual reports, websites and responses to ad hoc requests.

Institutional Effectiveness

The OIRAA is responsible for coordinating campus-wide and unit-level assessment of academic programs and administrative processes to support the University's quality improvement efforts. These activities include:

- Gathering and presenting institutional performance data
- Administering Rush University and other surveys
- Providing technical support and consultation to assist units in assessing student learning outcomes and administrative objectives
- Conducting special studies to evaluate the University's progress in achieving strategic goals
- Coordinating accreditation activities
- Supporting the University Assessment Committee in its assessment activities and program reviews
- Supporting and monitoring the HLC mandated quality improvement project

Contact the OIRAA staff at OIRAA_@rush.edu.



Rush University/Campus Information

Rush University's Campus

Office of Student Life and Engagement

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International Student Services

Office of Student Diversity & Multicultural Affairs

Campus Housing

Rush Community Service Initiatives Program

Recreation

Student Lounge

Student Lockers

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Worship Opportunities

Rush University Bookstore

Office of General Education Resources

Quick Copy Center

Library of Rush University Medical Center

McCormick Educational Technology Center

Media Services

Rush Photo Group

Rush University's Campus

The main campus of Rush University/Rush University Medical Center is located on the near west side of Chicago not far from downtown (often referred to as the Loop). The area surrounding the campus is undergoing much redevelopment. Of particular interest is the Chicago Technology Park, which incorporates biomedical research facilities and programs. Townhomes and condominiums have been built in Garibaldi Park, just east of the campus, and many new businesses are flourishing in the Taylor Street area. With other health care facilities in the Medical Center District including the University of Illinois at Chicago-West Campus, the John H. Stroger, Jr. Hospital of Cook County, and the Jesse Brown VA Medical Center Rush is centrally and conveniently located. The Marriott Chicago Downtown at the Medical District, a hotel and fine dining establishment, is located at the corner of Harrison Street and Ashland Avenue adjacent to the Medical Center. The main campus now consists of 22 buildings. This includes facilities for achieving the goals of the Medical Center: patient care, education and research. The main campus also includes two indoor parking facilities.

Armour Academic Center is the hub of most student activities. The Library of Rush University Medical Center and the McCormick Educational Technology Center (METC) are located in the Armour Academic Center, along with classrooms; laboratories; academic computing; specialized facilities; the Student Affairs Suite; the Office of Student Life and Engagement; the Office of Student Diversity and Multicultural Affairs; the Rush University Bookstore; a cafeteria; and the administrative offices of Rush Medical College, Rush University College of Nursing, the College of Health Sciences and the Graduate College.

Medical Center and Facilities

Laboratories are located throughout the Medical Center complex but are principally found in Jelke-South center. Additional departmental laboratories are located in the Cohn Research Building and in the Tech 2000 building located at 2000 W. Harrison Street. In addition to the main campus, Rush includes Rush-Copley Memorial Hospital, located in Aurora, and Rush-Oak Park Hospital, located in Oak Park. Directly across the Eisenhower Expressway from the main campus is the Triangle Office Building, which is home to finance, legal affairs, philanthropy and communication, the data center and other functions of the Medical Center. On-campus housing for students includes studio, one-bedroom and two-bedroom apartments at Center Court Gardens, located just east of the Medical Center. Many students also live in private housing in the area surrounding the Medical Center.

The Office of Student Life and Engagement distributes a campus map to new students and publishes the Rush University Student Handbook, which includes a yellow pages section providing locations and telephone numbers of persons, offices, departments and buildings of interest to students.

Office of Student Life and Engagement

The mission of the Office of Student Life and Engagement is to provide an atmosphere that will enhance students' academic experiences. The Student Life and Engagement staff works closely with students, faculty and the administration to identify student needs and to design and implement programs and policies to meet those needs. The professional staff serves as advisors to student organizations; provides career counseling and services to students in each academic discipline; assists with the development and implementation of orientation and commencement events; and sponsors educational, multicultural and social activities for all students.

Office of Student Life and Engagement

Armour Academic Center

600 S. Paulina St., Suite 984

Chicago, IL 60612

(312) 942-6302

Fax: (312) 942-9283

Student_Life@rush.edu

www.rushu.rush.edu/studentlife

Student Activities

The Office of Student Life and Engagement sponsors programs that are open to all Rush University students and faculty. The primary objective of these programs is to enhance the co-curricular life of the Rush student community. In the past, the office has sponsored events including Rush Roundtables and Current Issues in Healthcare as well as Fall Into Rush (student organization fair), International Student Day and Student Appreciation Week. In addition, the office encourages exploration of Chicago's many cultural, educational and social resources by regularly offering students discounted museum, theatre, sports and movie tickets. The staff in the Office of Student Life and Engagement welcomes input and assistance from students in the planning and implementation of programming events. Students wishing to become involved are encouraged to contact the Office of Student Life and Engagement at (312) 942-6302 or via email at Student_Life@rush.edu.

Career Development

The Office of Student Life and Engagement assists students who are preparing for the job search and residency application processes with resumes, curriculum vitae, cover letters, personal statements and interviewing techniques. A variety of career resources are available for student use, including workbooks, handouts and guidebooks. Many of these resources are available on the RUConnected Portal site.

Students are also individually assigned academic advisors from their associated colleges who are knowledgeable about the student's educational program. These advisors provide assistance in curriculum selection, academic progression and professional and career development.

Publications

The Office of Student Life and Engagement oversees the publication of student-related materials, such as the *Rush University Student Handbook* and the *New Student Picture Book*. The *New Student Picture Book* may be accessed through the RUConnected Portal site. *Rush University Student Handbook* is provided to each new student at the time of orientation and is also available online at www.rushu.rush.edu/studentlife.

Counseling Center

The Rush University Counseling Center is open all year and provides professional counseling at no charge to all currently enrolled students. Individuals and couples explore a variety of concerns ranging from academic problems to issues encountered in the course of clinical training. Students also seek help for anxiety, depression, relationship problems, insomnia, eating disorders, sexual orientation and coming out issues, bereavement, family mental illness, and career decisions. The Counseling Center maintains strict standards of confidentiality. No information regarding a student is released to anyone — inside or outside of Rush — without prior consent of the student, within the limits of Illinois law. Contact with the Counseling Center does not become part of any other University record. The Counseling Center is located in 701 Kidston House. Appointments may be scheduled by calling (312) 942-3687.

International Student Services

International Student Services, housed within the Office of the Registrar and located in 440 Armour Academic Center, works with international students who are planning to study at Rush and will need authorization from the United States Citizenship

and Immigration Service (USCIS) to do so. International Student Services serves students in the following ways:

- Representing Rush to the Student and Exchange Visitors Program (SEVP) regarding the attendance of international students
- Helping prospective students navigate issues concerning international admission
- Issuing USCIS documents for F-1 students, to assure compliance with established governmental policies and procedures
- Consulting with current and potential students, academic and administrative offices, staff and faculty regarding nonimmigrant student issues
- Orienting new students to the Rush community in collaboration with the Office of Student Life
- Helping international students be an integral part of the diversity and culture of the Rush community

The International Student Services office is available to serve the needs of prospective and current international students and alumni. The office provides pre-arrival information, prepares immigration paperwork and provides orientations. For additional information, please call (312) 942-2030.

Office of Student Diversity & Multicultural Affairs

The Office of Student Diversity & Multicultural Affairs strives to create an environment that is welcoming, inclusive and supportive for all Rush community members. The office aims to develop a community culture that embraces diversity, equity and inclusion by appreciating the importance of this value in both the educational and clinical environments. The office displays this appreciation by collaborating with all colleges in the recruitment of students and faculty that is reflective of the diversity that exists in the communities Rush serves. These aims are undergirded by the goal and vision of the office.

Goal:

Shape and sustain a positive multicultural environment for all students at Rush University.

Vision:

Rush will be known for creating and promoting a nurturing multicultural environment in which faculty, students and staff from all backgrounds embody and respect attributes, values and diverse perspectives which reflect the communities that we live in and that we serve.

To achieve the goal and vision of the office, there is a commitment to:

- **Student Development** — Provides opportunities for students to participate in diverse leadership opportunities, professional development, service learning, community engagement, and mentoring, while highlighting and encouraging wellness in students' lives.
- **Education and Training** — Offers ongoing trainings, webinars, workshops, lecture series and events to promote diversity and inclusion awareness for students and the greater campus community.
- **Supporting Academic Success** — Assists in developing culturally inclusive academic support programs that complement the learning environment and foster academic achievement.
- **Campus Climate** — Implements a systematic, continuous assessment of campus climate for students and action plans to enhance a welcoming, diverse and inclusive student environment.

The Office of Student Diversity & Multicultural Affairs is located in the Armour Academic Center, 984B. For additional information, please call (312) 942-0725.

Campus Housing

Information pertaining to on-campus housing, including the application process and/or roommate selection, may be obtained from the Office of Student Life and Engagement, Suite 984, Armour Academic Center, or found on the website at www.rushu.rush.edu/studentlife/housing. Center Court Gardens, located on Harrison Street across from the Chicago Marriott at Medical District/UIC, consists of apartment-style living with almost 300 units available as studios, one-bedrooms and two-bedrooms. All apartments are unfurnished, are carpeted and have individually controlled heating and air conditioning, modern appliances, and bathtubs with showers. Basic cable and Internet are included in the rent, but electric and heating utilities are not included.

Application Process

Students can apply for housing upon their acceptance to Rush University. Applications for both new and returning students are available via the web at www.rushu.rush.edu/studentlife/housing. Because on-campus housing is in great demand, Rush University has established the following set of priorities for assigning students to available units. Students grouped in

priority number one receive the highest priority, followed by those in priority number two, etc.

Priority one: Returning undergraduate, graduate and professional students who apply for on-campus housing by the advertised deadline.

Priority two: Incoming undergraduate, graduate and professional students who begin their academic programs in the summer academic term and have been accepted for admission and apply by April 15.

Priority three: Incoming undergraduate, graduate and professional students who begin their academic programs in the fall academic term and have been accepted for admission and apply for housing by May 1.

These priorities will be used as a guide when assigning housing. Returning students who fail to submit a housing application for the succeeding year prior to the advertised deadline will lose their number one priority. Rush University reserves the right to make exceptions to these priorities when extenuating circumstances exist. Apartment types available:

Studio Apartment	One student
One Bedroom Apartment	One to two students
Two Bedroom Apartment	Two to four students

Notification of acceptance into University housing will be sent to each student assigned to on-campus housing. New students must receive an acceptance for admission to the University before any housing notification will be sent. Entering students whose program of study begins in the summer academic term will be sent housing assignments by the beginning of May. Students who begin their programs in the fall will receive housing assignments by the end of May. Returning students will receive their housing notifications in April. Students starting in the winter or spring academic term will receive their housing assignment any time after May 1.

Lease and Deposit

A lease is included with each letter of acceptance into University housing. The lease, accompanied by a security deposit equal to one month's rent, must be signed and returned. Failure to return the lease and the security deposit by the specified deadline will result in the loss of the housing assignment. Students are billed for rent along with tuition and fees prior to the beginning of each academic term.

Consolidation Policy

In an effort to maximize the number of on-campus housing spaces available to Rush University students, consolidation of tenants may occur. This consolidation policy will affect only those students who occupy an apartment by themselves that was originally leased to two or more students. Such a situation can occur when a roommate leaves University housing during the course of the academic year. If consolidation is necessary, students involved will be informed in writing. At that time the student will have the following options: 1) share an apartment with another student in any building who is also in need of a roommate, 2) find a Rush University student roommate of his or her choice, 3) have a roommate assigned from the available applications, or 4) pay the full rent of the apartment. If the fourth option is chosen, the apartment will become a single accommodation only through the end of the current lease. If the student wishes to renew the lease, the student will have the option of remaining in the apartment with the understanding that he or she will receive a roommate or will be given an opportunity to move to another available apartment.

Students should address questions concerning the application process, assignment process, or roommate selection to the staff at Center Court Gardens via phone at (312) 226-2836 or via email to RU_Housing@rush.edu.

The Office of Student Life and Engagement is also available to assist students with their off-campus housing needs. Information regarding local apartment listings, transportation, Internet resources, etc., is available. Students are also encouraged to check bulletin boards throughout Armour Academic Center for apartment leads within walking distance to Rush, including the University Village/Little Italy neighborhoods. An off-campus housing guide is available on the housing website (www.rushu.rush.edu/studentlife/housing) to assist in making decisions such as how much rent can be afforded, what commuting distance is acceptable and if finding a roommate will be necessary. Rush University accepts no responsibility for off-campus arrangements.

Rush Community Service Initiatives Program

The mission of Rush Community Service Initiatives Program is to provide community-based volunteer experiences for Rush students that enhance their ability to work in interprofessional teams, develop patient relationships, and care for diverse populations, and to provide targeted services based on community need.

We will achieve our mission by:

- Aligning volunteer experiences with the findings of the Rush Community Health Needs Assessment
- Developing community programs that align with Rush's community implementation plan
- Providing appropriate supports and training for student volunteers
- Accessing the outcomes of community programs
- Evaluate the effects of community service experiences on the personal learning and development of the students

Recreation

For students interested in yoga and Pilates classes, Rush University Medical Center Employee Wellness sponsors classes during the noon hour and late afternoons. For a class schedule, fees and other information call (312) 942-5878 or visit the Medical Center intranet at iris.rush.edu/wellness and click on Employee Wellness.

Student Lounge

The Student Lounge, located on the ninth floor, north end, of Armour Academic Center is equipped with couches, a flat screen television, an email workstation, tables and chairs, a copy machine and a kitchen (refrigerator and microwave ovens). All students are invited and encouraged to use the facilities of the lounge. A student ID proxy mechanism located along the west corridor allows students 24-hour access to the lounge.

Student Lockers

At the time of orientation, Rush University will assign lockers for the storage of coats, books and other miscellaneous articles. Please note that most lockers are shared with another student. Be advised that Rush University assumes no responsibility for the loss of personal property from lockers. If any difficulties arise with a locker, contact the Office of Student Life and Engagement, located in 984 Armour Academic Center.

Student Organizations

The Office of Student Life and Engagement recognizes the interests and goals of each student organization through administrative and limited financial support. Students who wish

to establish a new organization are encouraged to stop by the office and speak with a staff member. Currently, there are nearly 35 active organizations, including the American Medical Student Association, the Graduate College Student Council, National Student Speech-Language-Hearing Association, Rush Medical College Student Council, Rush Muslim Students' Association, RU-Student Nurses Association and the Student Occupational Therapy Association. A complete description of all student organizations can be found on the Student Life and Engagement website.

Voter Registration

Voter registration materials are available through the Office of Student Life and Engagement, located in 984 Armour Academic Center. These voter registration materials allow for a student to vote in local, state and federal elections.

Worship Opportunities

The Department of Religion, Health and Human Values provides weekly opportunities for worship in the J. Hall Taylor Memorial Chapel, located on the first floor of the Kellogg building near elevator C, as well as special services on faith-group holidays. A Meditation Room, available at all times as a refuge for the spirit, is located on the fourth floor Atrium Lobby. A directory of churches in the area is available by calling the Department of Religion, Health and Human Values at (312) 942-5571. Chaplains are available for consultation about professional and personal issues.

Rush University Bookstore

The Rush University Bookstore, located on the ground level of Armour Academic Center, is a health sciences bookstore serving the needs of students, faculty and staff at Rush University Medical Center. The bookstore stocks the required and recommended textbooks for courses offered at Rush University, as well as an assortment of reference and review books. Special orders are handled by the bookstore and will generally be received in one or two weeks. Lab coats and medical-surgical equipment are also stocked. School supplies, greeting cards, convenience items, USPS stamps, computer software and Rush insignia items are also available.

Office of General Education Resources

The Office of General Educational Resources offers a wide variety of services to Rush University students and faculty. Available services include Laboratory Services, Emergency Cardiac Care Program, and the Quick Copy Center. The office is located in the Multidisciplinary Laboratory (MDL) area on the 7th floor of the Armour Academic Center. The classrooms are open to students 8:00 a.m.-4:30 p.m., Monday-Friday, and are closed Saturday and Sunday. Students who need special laboratory instruments or services for education or research projects should discuss such needs in advance with the staff. For questions please call (312) 942-6791.

Quick Copy Center

Located on the seventh floor of Armour Academic Center, this facility duplicates materials for educational purposes as well as general needs. A full range of services, including front and back copying, three-hole punched copies, booklets and multiple binding options, is offered through the center. Personal work of one or more copies can be accommodated for faculty and students at a reasonable fee. Quick Copy Center is open Monday through Friday from 8:00 a.m. to 4:30 p.m.

Library of Rush University Medical Center

The library serves the education, patient care and research needs of the students, faculty, staff and patients at Rush University Medical Center. Visit the library on the 5th floor of the Armour Academic Center or at <http://rushu.libguides.com>.

The library offers a comprehensive collection of print and online materials covering all areas of the health sciences. The library's database collection features resources such as SCOPUS, CINAHL, Medline, and PsycINFO. Other online resources include point-of-care reference tools like UpToDate and Clinical Key, which provide concise topic reviews, clinical guidelines, extensive drug information and full text for a wide range of medical textbooks and journals.

If the library does not have an item, it can be requested from another library via interlibrary loan or I-Share. Books, journal articles, proceedings, dissertations and audiovisual materials can all be requested from other institutions. Turnaround time and loan period depend upon the lending library. For details call (312) 942-5950.

The students, faculty and staff of Rush University Medical Center may access online library resources, such as full-text journals,

eBooks and databases, from off-campus locations. For more information please call (312) 942-5950.

Reference librarians provide personalized information services to all members of the Rush community. Request a comprehensive literature search or schedule individual or group instruction at your convenience to learn how best to use PubMed, evidence-based medical databases, bibliographic management tools or any other library resources. Call (312) 942-6784 or email lib_ref@rush.edu to make arrangements for individual or course-related instruction.

McCormick Educational Technology Center

The McCormick Educational Technology Center (METC), a department of the library of Rush University Medical Center, is a media, computer and educational support center. Its mission is to facilitate university teaching and learning through the use of media, computer software and instructional design assistance.

The METC houses a large collection of media, including videocassettes, DVDs, CD-ROMs, computer software, slide/tape programs and audiocassettes, which are available for student and faculty use. Students may request, in advance, media materials for use in course presentations.

The METC is home to two multimedia classrooms, Room 903 (capacity: 40) and Room 908 (capacity: 16), and three media viewing rooms. Rush faculty can reserve multimedia classrooms for classes and exams. Students can use viewing rooms for study and group discussion. Workstations in Room 917 (computer lab) are also available for students and residents through a touchless access control system. There are two printers in the METC. Software installed on workstations includes the Microsoft Office suite, secure exam software, SPSS and specific software requested by faculty for instruction. Rush faculty can reserve computer classrooms via the Astra scheduling system.

The METC also coordinates the Academic Testing Center located in the Triangle Office Building. The ATC accommodates up to 75 students for online testing, and includes a multipurpose waiting area that can also function as a collaborative learning space. The ATC is also reserved through the Office of the Registrar.

Students with a valid Rush University ID have computer lab access on a first-come, first-served basis 24 hours a day, seven days a week. Tablets, laptops, projectors, video and audio recorders, and other accessories are available to students for limited checkout.

METC staff partner with faculty to enhance instructional content and delivery. This includes locating, previewing, evaluating and acquiring commercially produced software and media for use within courses and offering collaborative support with audio/visual projects using products such as Blackboard Collaborate, Camtasia, and Panopto. The METC provides access to methods of creating lecture files to post in RULearning (Blackboard), the university's web-based learning management system, and to virtual classroom software to allow distance education students to communicate with their instructors and peers in real time.

METC staff also provide assessment support through the scanning and reporting of testing results to faculty through optical mark reader (OMR) test forms, and online testing. The METC collaborates with Information Services to provide Blackboard support for both faculty and students.

Media Services

Media Services, located at 121 Professional Building 1, provides a wide range of audio/visual support for classrooms, meeting rooms and auditoriums throughout the University and Medical Center. Additionally, Media Services works with Rush Photo Group in providing a full-service video production department that is able to assist in scripting, shooting and editing a client's video program. Video duplication services, as well as audio/visual equipment rental, are usually provided at no charge to the client. Media Services is glad to provide recommendations to faculty, staff or students who are purchasing audio/visual equipment. Please call ext. 2-5187 to reach Media Services.

Rush Photo Group

Rush Photo Group (located at 121 Professional Building 1) is an in-house photo studio offering any number of photographic services to students, faculty and employees. The Photo Group is available for graduation photos, portraits needed for applications, posters, passports and many other creative digital solutions. Video production is also available, working in tandem with Media Services from scripting and shooting to editing the final project. There is also a self-serve Mitsubishi kiosk available for printing from digital camera memory cards. For more information please call ext. 2-8278.



Rush University/Academic Policies

Administrative Offices

Office of the Provost
Office of the Registrar

Academic Resources and Policies

Academic Honesty and Student Conduct
Rush University Honor Code
Inappropriate Degree Usage
Continuous Enrollment
Credit by Proficiency
Academic Credit
Grade Point Average
Grade Report
Grading and Numbering System
Graduation and Commencement
Thesis/Dissertation Requirements for Graduation
Hazardous Exposure Procedures
Health Insurance (see Tuition and Financial Aid)
Immunization Records Requirements
Incomplete Grades
Pass/No Pass Grading Option
Repeated Courses
Repeated Courses: Rush Medical College
Room Reservations
RULearning (Blackboard)
Students-at-Large
Student Email Accounts
Student Account Management and Identity Security
Student Identification Cards
Transcripts
Transfer Credit

Registration

Adding/Dropping Courses
Auditing a Course
Course Schedule
Independent Study
Registration Process

Withdrawal/Leave of Absence

Administrative Withdrawal
Voluntary Withdrawal
Leave of Absence

Student Records

Name, Address and Phone Number Changes
Privacy and Confidentiality of Student Records and FERPA

Administrative Offices

Office of the Provost

The Provost is the chief academic officer of the University. The Provost oversees academic policies and activities throughout the University. Responsible for strategic planning, the Provost provides leadership in setting the vision for the University and for fulfilling the University's mission. Management of the colleges is accomplished through the Deans, who report directly to the Provost.

The Vice Provost is responsible for University operations and planning as well as the coordination of academic resources. In addition, the Vice Provost provides support to the Board of Overseers of the University.

The Associate Provost for Research Affairs has overall responsibility for research activity and policy at the University and oversees all aspects of the research enterprise within the University.

The Associate Provost for Academic Affairs is responsible for the University activities in Multicultural Affairs, Global Health Affairs, and Faculty Affairs.

The Associate Provost for Student Affairs oversees programs and services that support student life. Responsibilities include oversight of enrollment services, counseling services, financial aid, international services and student life.

The Associate Provost for Professional Education and Community Engagement is responsible for the development and administration of the University's Office of Continuing Health Professional Education. Additional responsibilities include development of student volunteer services based on community health and student service learning needs, facilitating inter- and intra-professional student clinical experiences across the University and College of Nursing community faculty practice sites, and aligning the University's community efforts with those of the Medical Center's Community Benefit Plan and the Community Needs Assessment findings.

The Associate Provost for Institutional Research, Assessment and Accreditation is responsible for providing accurate and reliable data in support of planning, policy making, academic assessment and program reviews, in accordance with the institution's missions and strategic goals.

Office of the Registrar

The Office of the Registrar (located in 440 Armour Academic Center) supports the academic mission of the University by facilitating the transition of students from matriculation to

degree completion; interpreting and enforcing established academic and administrative policies and procedures; overseeing the Family and Educational Rights Privacy Act of 1974 (FERPA); scheduling all classroom space in the Armour Academic Center; issuing student identification cards; fulfilling transcript and credentialing/licensing requests; and providing accessible, reliable, responsive and courteous personal services and support that meet the diverse needs of the University's students, faculty, staff, administration and alumni. More specific information about the Office of the Registrar is available at <http://www.rushu.rush.edu/registrar>.

Academic Resources and Policies

Academic Honesty and Student Conduct

Rush University students and faculty belong to an academic community with high scholarly standards. As essential as academic honesty is to the relationship of trust fundamental to the educational process, academic dishonesty violates one of the most basic ethical principles of an academic community, and will result in sanctions imposed under the University's disciplinary system.

Examples of conduct that would subject a student to disciplinary action include but are not limited to:

- All forms of academic dishonesty including but not limited to: cheating; plagiarism; collusion; gaining or seeking unfair advantage in relation to any work submitted; helping others to gain an unfair advantage; removing examination materials from a secure examination area; the unauthorized downloading or copying of examinations that are given online; fabricating assigned academic work, including clinical assessments, and presenting them as authentic; facilitating academic dishonesty; unauthorized examination behavior
- Obstruction or disruption of teaching, research, administration, clinical practice and community outreach or other University/Medical Center activities
- Falsification of student records, transcripts or financial aid forms or applications
- Theft of or damage to University/Medical Center property or the property of a member of the University/Medical Center community
- Threatened or physical abuse of any person or action that threatens or endangers the safety of others

- Misrepresentation, falsification, alteration, or misuse of the University/Medical Center documents, records or identification, or research data
- Unauthorized use or entry of University/Medical Center facilities
- Conviction of a crime deemed serious enough to render the student unfit to pursue his or her profession
- Conduct that is inconsistent with the ethical code of the profession the student is preparing to enter
- Unlawful use or possession of controlled substances on the Medical Center campus
- Unauthorized possession or concealment of firearms or other weapons on Medical Center premises at any time
- Attempting to gain access to another's email or computer account, username or password
- Knowingly setting off false fire, safety or security alarms
- An accusation of student and/or faculty academic dishonesty or misconduct made in bad faith

Rush University Honor Code

Rush University Honor Code

I pledge that my academic, research, and/or clinical work will be of the highest integrity.

I shall neither give nor receive unauthorized aid.

I shall not represent the work of others as my own.

I shall not engage in scientific misconduct, and I shall treat all persons with the greatest respect and dignity, just as the ethical codes of Rush University Medical Center and my future profession demand.

I recognize that behaviors that impede learning or undermine academic, research, and clinical evaluation, including but not limited to falsification, fabrication, and plagiarism, are inconsistent with Rush University values and must be reported.

Implementation of the Honor Code

This Honor Code (from now on referred to as the Code) sets the standards for expected professional behavior within the University and the Medical Center. Commitment to this Code is a shared responsibility of all faculty, staff, and students within the Rush University community to ensure the highest standards of behavior, whether in the classroom, the laboratory, or in the clinical setting, and to ensure that education obtained at Rush provides a sound foundation for each student's future success as an academic, scientific, or healthcare professional.

Code Enforcement

Any violations of this Code or suspicion of student or academic misconduct should be reported to the student's college for further review in accordance with the procedures specified by that college. Each college will be expected to set standards for addressing Honor Code violations and cases of misconduct in a fair and consistent manner that best fits their respective student population. Students refusing to sign must submit a letter to their Dean's office explaining why, and adherence to the Code is required for matriculation, whether or not the document has been signed. The Code may also be enforced for off campus actions when the student is representing himself or herself as a member of the University.

Commitment

By signing below, I affirm my commitment to this Code and pledge to act with integrity and adhere to the Rush University values of Innovation, Collaboration, Accountability, Respect, and Excellence. I understand that this signed document becomes part of my permanent record, and I must uphold the letter and spirit of this Code throughout my Rush education.

Inappropriate Degree Usage

A student may not refer to himself or herself as having earned a specific degree until:

- All degree requirements have been successfully completed,
- A completed Degree Approval Form has been submitted to the Office of the Registrar, and
- The official date of graduation for a particular term has been reached.

A student who disregards this policy will be referred to the committee that addresses professional ethics violations for that student's program or college.

Continuous Enrollment

Rush University requires continuous enrollment in the majority of its academic programs from the time a student matriculates through a student's graduation. Exemptions for the summer term only include both first-year medical students and Health Systems Management majors. Students who are not officially enrolled or have not submitted a Petition for Leave of Absence or Voluntary Withdrawal form risk being administratively withdrawn from the University.

A student enrolled in a noncredit residency or academic enrichment program prior to receipt of his or her degree must be registered for the Continuous Enrollment course to retain his or her student status.

Any degree or certificate student not enrolling in a new course but needing to replace an outstanding incomplete grade must register for the Continuous Enrollment course until the grade is satisfied.

A student who is auditing a course and not allowed in other courses during the same term must register for the Continuous Enrollment course to be charged appropriately.

Credit by Proficiency

A student who passes a proficiency examination at Rush University will earn academic credit toward the degree. Programs have the discretion to offer credit by proficiency (e.g., standardized examinations such as ACT-PEP Challenge or Advanced Placement Exams) and/ or achieved prior learning (such as Continuing Education Units). Rush Medical College does not offer credit by proficiency.

Credit by proficiency and/or achieved prior learning is based upon documented equivalence with courses offered by the program. The minimum standards and format for demonstrating proficiency are determined by program faculty. Formats for demonstrating proficiency may include departmentally developed examinations, licensure/certification exams, portfolios, and competency demonstrations.

Credit awarded by proficiency will equal the credit value of the course(s) as listed in the Rush University Catalog under which the student matriculated. Information that is posted on the transcript for approved credit is the prefix, number, and title of the course section, the credits awarded, and the grade of "K".

Credit for the course will appear in the appropriate term as credit earned. Credit earned by this mechanism will not be used in calculating the student's grade point average (GPA).

A fee or partial tuition related to what the student would have been charged may be assessed.

Academic Credit

Academic credit is awarded to a student upon the successful completion of an approved instructional course or by the demonstration of competencies, proficiencies, or fulfillment of learning outcomes equivalent to that provided by an approved instructional course.

One unit of academic credit is the measure of the total time commitment a typical student is expected to devote to learning per week of study.

Total time devoted to learning includes but is not limited to: classroom or faculty instruction in either a synchronous or asynchronous mode; time devoted to individual conferences with

instructors; reading and completion of learning activities and assignments; posting in online discussion folders; performance demonstrations; examinations; work associated with completion of capstone assignments, theses, or dissertations; laboratory work; clinical practica; or any other activity required of the student.

One hour of credit is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately 15 weeks for one semester or one trimester hour of credit or 10 to 12 weeks for one quarter hour of credit or the equivalent of at least 37.5 hours of work for one semester or one trimester hour of credit or 25 hours of work for one quarter hour of credit.

In this context, an hour of work is defined as 50 minutes.

Course credits are not calculated for Rush Medical College and 2nd- or 3rd-year Physician Assistant Studies courses; however, the number of weeks of clinical experiences appears on the student's transcript. Credit hour assignment for time spent in clinical practica, internships, seminars, and laboratory work vary according to college or program requirements.

Grade Point Average

The student's undergraduate and graduate transcripts show a grade point average (GPA) for each term in which grade points were earned and show cumulative GPA for all work taken at Rush in a particular academic level.

When a course is repeated, only the most recent attempt is computed in the GPA; although all grades will display on the transcript.

No grade points are assigned for work taken on a pass/no pass basis, and therefore, are not computed in the grade point average.

Undergraduate students who are required to enroll in courses that typically are taught at the graduate level will have these courses count toward their undergraduate programs of study; thus the credits and grade points will be calculated as part of the undergraduate transcript.

Grade Report

Students can access RUCONNECTED for their grade report. Grade reports are not mailed to students. Printed copies of a student's grade report are unofficial and intended for the student's personal use and should not be accepted by another college/university in lieu of an official transcript.

Grading and Numbering System

Grade	Points	Description
A	4.0	Excellent
B	3.0	Good
C	2.0	Satisfactory for undergraduates but may not be acceptable at the graduate level
D	1.0	Minimal pass for some undergraduate programs. May not be acceptable at graduate level. Not used at the graduate level by the College of Nursing, The Graduate College, or the Department of Health Systems Management.
F	0	Failure
P	0	Passing
HP	0	High Pass (only used by Rush Medical College for 3rd- and 4th-year clinical courses)
N	0	No Pass
H	0	Honors (only used by Rush Medical College)
W	0	Withdrew between weeks 2 through 5; also used by Rush Medical College when a circumstance beyond the student's control prevents completion of course requirements regardless of withdrawal date during the quarter
WP	0	Withdrew passing between weeks 6 through 10; for courses with a Pass/No-Pass Grading basis
WF	0	Withdrew failing between weeks 6 through 10; for courses with a Letter (A–F) Grading basis
WN	0	Withdrew not passing between weeks 6 through 10
K	0	Credit earned through proficiency examination
T	0	Credit accepted in transfer from another college/university
CIP/IP	0	Course in progress and grade not reported
I	0	Incomplete
NR	0	No Record (not used after summer 2009)
CC	0	Course continues into the next term. Grade received at end of series is grade for entire course
AU	0	Audit
XX	0	Participation in an ungraded course or residency

Graduation and Commencement

Registration

Students must be registered for the term in which they graduate.

Application for Graduation

Only Rush University students who are candidates for a degree may participate in the commencement ceremony. Certificate candidates are ineligible to participate.

Although Rush University has multiple graduation dates during which degrees are conferred, the University has only one commencement ceremony.

Students are invited to participate in the commencement ceremony if:

- They graduated in the fall, winter or spring term immediately preceding the current academic year's ceremony
- They are anticipated to graduate at the end of the spring or summer terms that immediately follow the current academic year's ceremony

Doctoral students writing a dissertation and master's students writing a thesis must provide the title of their dissertation/thesis by the date indicated on the Degree Approval Form in order to have that title included in the commencement program.

Publication of a student's name, academic credentials and/or dissertation/thesis title in the commencement program does not indicate that a degree has been officially conferred by Rush University.

Students must be registered for the term in which they graduate.

All degree-seeking students must submit both Intent to Graduate and Degree Approval forms to the Office of the Registrar by the published deadlines.

Students who do not submit either the Intent to Graduate form or the Degree Approval form by the published deadline risk a delayed graduation and may be charged a processing fee.

The student's signature on the Intent to Graduate form signals that the student is ready to graduate; allows, only for purposes of the ceremony, the release of directory information restrictions enacted by the student through his or her signature on the Directory Information Restriction form; permits release of the student's name and address to the external photography vendor with whom Rush contracts and to have the vendor place photographs of the student on its website; permits the University to publish the student's picture in a picture composite; for medical students, permits publication of the student's name, photograph, prior degrees and universities/colleges attended in the Rush

Medical College yearbook; permits Rush University to print and/or announce the following:

- Student's name as indicated on the Intent to Graduate form
- Honors or awards received
- Previous colleges/universities attended and
- Prior degrees earned

The Degree Approval form must be submitted after all academic degree requirements are completed. These include:

- All program prerequisites, including general education requirements
- All courses required in the major program of study and completion of required cumulative credit hours
- Residency requirements
- Dissertation/thesis defense (if required by college)
- Submission of the dissertation/thesis to the library (if applicable)
- Achievement of the minimum cumulative GPA of 2.0 for undergraduate and 3.0 for graduate students (not applicable to Rush Medical College)

Awarding of Degrees

Rush University degrees are dated the day following the last day of the term in which the degree requirements are completed. Degree requirements must be fully met before the next term officially begins; otherwise, the student will be required to register for the subsequent term and will graduate at the end of that term. The student's transcript, diploma and other notification of degree conferrals will be held until a student's financial obligation has been met. Outstanding financial obligations have no effect on the awarding of degrees.

Latin Honors

Candidates for the Bachelor of Science degree who have demonstrated academic excellence are honored at commencement by the Rush University faculty. Those earning a 3.40 to 3.59 cumulative grade point average at Rush are awarded the Bachelor of Science degree cum laude; 3.60 to 3.79, magna cum laude; 3.80 to 4.00, summa cum laude. Only Rush University courses are calculated into the GPA. Latin honors appear on the student's transcript and diploma and are typically announced during the graduation exercises, including the Commencement ceremony and at college/departamental convocation/awards ceremonies.

Graduation Prizes and Awards

Many prizes and awards are given at the time of graduation. Award winners are identified in the Commencement ceremony program and in college/departmental convocation/awards ceremony programs.

Thesis/Dissertation Requirements for Graduation

Doctor of Philosophy (PhD) candidates must complete a dissertation. The Doctor of Nursing Practice (DNP) program requires completion of a scholarly project. Some master's programs require a thesis to meet degree requirements.

Each thesis/dissertation/scholarly project must be original and cannot have been used to meet the requirement of any other degree, either at Rush University or any other university.

Each student will have a committee whose role is to assure that the student's thesis/dissertation/scholarly project is of high quality and meets the standards of the program and the University for originality, contribution to the field, and scholarly presentation.

Review of a thesis/dissertation/scholarly project will follow the sequence of steps as described by each college, including the prescribed preparation manual for each degree.

Students must give a public presentation of the knowledge developed through the thesis/dissertation/scholarly project process to the academic community.

Public presentation of the thesis/dissertation/scholarly project must precede the final approval by the thesis or dissertation committee.

A copy of the thesis/dissertation must be approved by the Director of the Library of Rush University Medical Center for conformance to publishing requirements and copyright compliance. Scholarly projects are not reviewed by the library.

Hazardous Exposure Procedures

Exposure Incident Definition: Eye, mouth, mucous membrane, non-intact skin contact or parenteral exposure to blood or potentially infectious or hazardous materials that result from the performance of a duty related to a student's educational program.

Procedure at Rush University Medical center:

1. Wash injured area with soap and water. If eyes, nose or mouth, use water only.
2. Immediately report the incident to your preceptor/course instructor.

3. Immediately call and then report to Employee and Corporate Health Services (ECHS), Tower 1-ED-Pod C (312) 947-0699.
4. If ECHS is closed, immediately report to Emergency Department (ED) Tower 1 (312) 947-0100. Please bring your student ID or indicate that you are a student and not an employee. If a student is seen in the ED, that student must report to ECHS on the next business day.
5. Supply ECHS or ED nurse or physician with the following information on the source: name, date of birth, medical record number, known medical diseases (Hepatitis B, HIV) and patient room number. All information is recorded confidentially in the Blood/Body Fluid Exposure Record.
6. Students will be counseled or treated as deemed appropriate by ECHS or ED personnel.
7. Return to ECHS or to consultants as directed for follow-up lab work and treatment as indicated.
8. Bills for services obtained from the ED or consultations will not be covered by ECHS and should be submitted to the student's private insurance.

Phone Numbers Students May Need:

Rush University Counseling Center
(312) 942-3687

Rush University Medical Center Campus Security
(312) 942-5678

Rush University Medical Center Emergency Room
(312) 942-0100

Rush University Medical Center Employee and Corporate Health Services
(312) 942-5878

Rush Hotline
(877) 787-4009

Lifetime Medical Associates
(312) 942-8000

Crisis Lines:

Chicago Police Department
911

National Suicide Hotline
(800) 273-8255

YWCA Rape Crisis Hotline
(888) 293-2080

Alcoholics Anonymous 24-hour Hotline
(312) 346-1475

Narcotics Anonymous 24-hour Hotline
(708) 848-4884

Northwestern Memorial Hospital 24-hour Hotline
(312) 926-8100

Domestic Violence Helpline (City of Chicago)
(877) 863-6338

Sarah's Inn Hotline (domestic violence)
(708) 386-4225

Immunization Records Requirements

Program-specific health and immunization requirements are determined by each college and/or academic program:

- Students are notified at the time of admission by the college or program of the health and immunization requirements for matriculation into the University.
- Students must comply with annual health and immunization requirements.
- Students who do not submit the proper proof of fulfilled health and immunization requirements by the designated deadline will be prohibited from registering for the next term and may be disengaged from the program until these requirements are met. Late registration fees will apply.
- Students should be aware that clinical sites outside of Rush may have additional requirements.

Students with a medical or religious exemption will be required to adhere to state and hospital policies concerning infection control.

Incomplete Grades

The grade of incomplete ("I") is given only when circumstances beyond the student's control prevent completion of course requirements and the student has received permission to defer completion of these unmet course requirements.

Students must be enrolled during the term in which course requirements are completed. Students enrolling only to complete requirements for a course in which a grade of incomplete was given must register for the Continuous Enrollment course (XXX999) for zero or one credit hours. Upon completion of the course requirements the ("I") grade will be replaced by the new grade earned in the course.

A student receiving a grade of ("I") in a course may not begin another course for which the incomplete course is a prerequisite. A student who fails to remove the incomplete grade within the specified time period will receive a final grade of "F" or "N" in the course. It is the student's responsibility to pursue the completion of an incomplete grade.

Students in the College of Nursing, the College of Health Sciences, or the Graduate College and students-at-large must complete the unmet course requirements, typically within one term after the term in which the incomplete grade was assigned and not to exceed one calendar year, unless an extension is approved. Students in the College of Nursing may not register for new courses if they have two or more incomplete grades.

Rush Medical College students will be informed by the course instructor and the Office of Medical Student Programs regarding the specific time frame in which an incomplete grade must be resolved.

Additional college-specific policies may apply.

Pass/No Pass Grading Option

Designated letter grade courses may be taken as pass/no-pass based on approval by the course/program director. The pass/no-pass option is college and course specific, as is the proportion of courses that can be taken pass/no pass. The decision to take a course for a pass/no pass grade cannot be changed after the first Friday of the term.

Repeated Courses

Some courses, such as research and clinical courses, may be repeated. These are usually indicated in the course description. All grades and grade points are counted in the GPA for these courses. For all other courses that are repeated, only the most recent grade is counted in the GPA. Both the original course and the repeated course appear on the student's transcript.

Repeated Courses: Rush Medical College

All instances of a course are represented on the student's official transcript. Course and exam remediations are also represented.

Room Reservations

To schedule the use of classrooms, lecture halls and auditoriums in the Armour Academic Center, individuals should request a room from the Office of the Registrar. The Office of the Registrar will assist in making room reservations for classes, meetings and campus events based on room availability. Priority for rooms is given to instructional/class meetings, followed by standing meetings, ad-hoc meetings, student organizations and other requests on a first-come, first-served basis.

Student events must have the approval of the Office of Student Life regarding the date/time and either the organization faculty sponsor's or the Office of Student Life's verification regarding the sponsorship of the event.

RULearning (Blackboard)

RULearning (Blackboard) is a web-based learning management system for course management and delivery. Instructors may use Blackboard to provide students with course materials, discussion boards, online exams, virtual chats and more. The degree to which Blackboard is used in a course varies. Some courses may be conducted entirely online through Blackboard, without any on-campus sessions, while others may use Blackboard as a supplement to face-to-face sessions.

Account Creation

Students will have RULearning accounts created for them automatically when they have a Rush email account created and register for a course that requires Blackboard access. Students will receive their RULearning account through their Rush email.

Account Deactivation

RULearning accounts for students will remain active for the duration of their affiliation with the university. Students' accounts will be deactivated 14 days after their graduation or their affiliation with the University ends.

Course Availability and Retention

Courses in RULearning are available to students on the start date of the term.

Courses will be retained in RULearning for one year past their expected end date. At the end of this period of time, courses will be archived and removed from RULearning. Students will be informed how to download relevant information from their courses that they might need after leaving Rush.

System Availability

The Blackboard system is available on campus via the Rush network and off campus via public Internet. System maintenance is performed every Sunday between 2 a.m. and 6 a.m. Central time. The system may be unavailable during this time.

Students-at-Large

Individuals who have not formally matriculated to a degree or certificate program but who want to enroll in a course may do so by completing the Student-at-Large Registration form.

Students are not allowed to take Rush Medical College courses as a student-at-large.

Students are not allowed to take clinical courses as a student-at-large.

An instructor is not obligated to accept a student-at-large in his or her class.

A final grade will be assigned to any course taken as a student-at-large. Individuals should be sure they have the appropriate preparation to take any courses they register for as students-at-large.

Students in degree or certificate programs have enrollment priority over students-at-large.

Students-at-large may be removed from a course if degree- or certificate-seeking students need to enroll in that class. If a student-at-large is removed from a class the student has already paid for, a full refund will be issued.

A student may accumulate no more than 12 credit hours of academic credit as a student-at-large. These hours may be taken within one term or over a period of time. Registration as a student-at-large that results in more than the allowable number of hours in the student-at-large status can only be authorized by the Dean or Associate Dean of the college offering the course(s).

Credit earned as a student-at-large will not necessarily apply toward a Rush degree, if the individual is subsequently admitted to a degree program.

Any incomplete ("I") grade earned as a student-at-large will revert to a permanent failing grade ("F") unless completed by the end of the next academic term. It is the student's responsibility to pursue the completion of an incomplete grade.

Student-at-Large Registration forms are only accepted during the designated priority registration period for continuing students for the term in question. Late forms will only be accepted if authorized by the Dean or Associate Dean of the college offering the course(s).

Student-at-Large Registration forms will only be processed with full tuition payment and all appropriate approvals.

Students-at-large who qualify for Rush University Medical Center employee LEAP assistance must have applied for LEAP assistance by the end of the designated priority registration period for continuing students for the term in question. Please note that the designated priority registration period may end earlier than the normal LEAP deadline for degree- or certificate-seeking students.

Students cannot be admitted to a Rush University degree or certificate program if they have had a probationary event as a student-at-large. Students who have already been admitted when a probationary event occurs will have their admission rescinded or be dismissed from the program. In order to be considered for admission an applicant must be considered in good academic standing.

Student Email Accounts

Rush University creates an email account for each student during the student's first term. Students are expected to check their email account with regular frequency since Rush University considers email an official means of communication. Often, students are notified of important news and deadlines via the campus email system. Students should also use the Rush email account to communicate with faculty and staff versus sending an email using a personal email account.

Should problems arise with the email account, please contact the Help Desk at (312) 942-4357 or via email at help@rush.edu.

Graduates of Rush University should have access to their Rush email account for 14 days after graduation. Students leaving the University but who have not graduated should expect to have their email accounts terminated immediately.

Rush University Medical Center has the right to assign, reassign or terminate any individual's access to electronic communications, information systems or networks and take disciplinary actions, up to and including dismissal, in response to any negligent or deliberate misuse thereof. Email belongs to the recipient. A user's mailbox is treated in the same manner as any other file belonging to that user.

Information proprietary to Rush University Medical Center may not be shared outside the organization without the approval of management. Patients' (HIPAA) protected information may qualify as a medical record and is considered confidential. Therefore, email related to patient care, treatment, therapy or testing should be incorporated into the patient's medical record or be encrypted. Rush University Medical Center is not responsible for the content of emails received.

Examples of actions that may be subject to disciplinary action include:

- Sharing account information, including user name and password
- Attempting to gain access to another's password, user name or email account
- Attempting to read, delete, copy or modify the email of other users
- Posting email messages with sexually explicit images or language that may be construed as harassment or disparagement of others based on a person's race, color, sexual orientation, gender identity and/or expression, religion, national origin, ancestry, age, marital or parental status, disability as

defined by Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, Americans with Disabilities Act Amendments Act of 2008, veteran's status, pregnancy or any other category protected by federal or state law or county or city ordinance

- Spamming

Student Account Management and Identity Security

Every approved user will be provided an individual computer account with a unique password. Users are able to create new passwords. Generic sign-ons used by groups of individuals are not allowed. Sharing a sign-on and password or the unauthorized access of another person's computer account is not permitted and can lead to disciplinary action up to and including dismissal.

Every Rush-affiliated user is responsible for every transaction originating from his or her computer account. Accounts that are not used for nine months may be deactivated without notice by Information Services.

Anyone engaging in unauthorized use, disclosure, alteration or destruction of data is subject to disciplinary action. Computer accounts may not be used in any manner that would be illegal or violate the following:

- Rush University Medical Center's Code of Conduct policy
- Any Rush policy addressing privacy; confidentiality; or the use or disclosure of patient, staff, physician, student or other data

Student Identification Cards

Rush students are required to wear their student ID card at all times while on campus. Students not wearing a valid student ID card could be asked to leave the University or Medical Center and related clinical sites. A valid student ID card is needed to access and use the library, laboratories, bookstore and student lounge, and is required for admission to some school events.

The student ID card is valid only while the student is enrolled at Rush University and is immediately deactivated upon graduation, withdrawal or dismissal from the University. Students must return the ID card to the Office of the Registrar upon separation from the University.

New students who attend a formal orientation program will be issued their ID card during the orientation. Otherwise, new students can request an ID card from the Office of the Registrar starting the Friday before the term in which the student is matriculating officially begins.

The Armour Academic Center building opens at 5:30 a.m. and is locked at 7:00 p.m., Monday through Friday. On Saturday, the building opens at 8:00 a.m. and is locked at 1:30 p.m. The building is closed on Sundays and holidays. If there is a special event going on in the building or a special request made, the opening and closing times may change. As always, any visitor may enter Rush through the main visitor entrance in Atrium Building and request a visitor pass.

In order to make it easier for students to enter the Armour Academic Center after the building has been locked at night and to utilize new and extended-hour study spaces, an ID card reader has been installed on the ground floor of the Armour Academic Center near the Bookstore. ID cards for Rush students, faculty and employees may utilize this card reader.

Temporary ID badges are available in the event that authorized personnel have forgotten their original ID. Personnel may obtain a temporary ID 8 a.m. to 4 p.m. Monday through Friday at the University Registrar's Office or at the Security office located in the Tower LL1502 during after hours, weekends and holidays. The temporary ID will allow access for a 24-hour period. If the temporary ID is not returned after the expiration, neither the temporary nor the original ID will work until the temporary ID is returned. The temporary ID represents your original ID. If either is lost, there is a \$10 replacement fee. If the ID card is damaged or stolen, then the replacement fee will not be assessed if either the damaged ID card or a copy of a police report is received by the Office of the Registrar.

Transcripts

Transcripts from Previous Institutions

As a part of the application for admission process, Rush University requires final and official transcripts from all institutions of higher education that a student attended, regardless of whether or not a degree was earned.

Rush University requires an independent evaluation of foreign credentials in the case when a student earned a degree outside of the U.S. or Canada.

Non-medical school graduates from foreign institutions require course-by-course U.S. equivalency reports. Evaluations of other types will not be accepted. Applicants should not submit foreign transcripts in lieu of a foreign credential evaluation.

International medical school graduates can provide proof of certification from the Educational Commission for Foreign Medical Graduates (<http://www.ecfm.org/>) in lieu of a course-by-course evaluation.

Individuals who apply using a Centralized Application Service (CAS) should submit their final and official transcripts and/or foreign credential evaluations directly to the CAS.

Individuals who are taking prerequisite or other coursework not listed on their CAS application need to submit their final and official transcripts to Rush University. NursingCAS applicants should submit all final transcripts directly to the CAS system.

Individuals who applied via CAS and whose degree was not conferred at the time of the application must submit their final official transcript with degree conferred information to Rush University. NursingCAS applicants should submit all final transcripts directly to the CAS system.

Non-CAS applicants must submit their official/ final documents directly to Rush University.

Rush University Transcripts

Copies of academic transcripts can be obtained at no cost to the student. The transcript is released only with written consent of the student or as consistent with legal requirements. Transcripts will not be released if the student has an outstanding financial obligation to the University.

Students may complete a Transcript Request form available from the Office of the Registrar website or by writing to the Office of the Registrar, Rush University, 600 S. Paulina Street, Suite 440, Chicago, Illinois 60612. Fax requests are honored at (312) 942-2310. The letter or fax must include the handwritten signature of the student. Five to six business days should typically be allowed for processing.

Transcript requests by Rush Medical College students to be used in support of residency applications should be made to the Office of Medical Student Programs rather than to the Office of the Registrar. A Medical Student Performance Evaluation letter is included with these requests. Copies issued to students will be stamped in red ink as "Issued to Student." All transcripts bear the signature of the University registrar or the registrar's designate.

Transfer Credit

Rush University may accept up to 90 quarter hours or 60 semester hours of credit toward General Education and other lower-level course requirements.

Graduate-level transfer credit is subject to the approval of the major advisor, program or division director, or designated college administrator based on an evaluation of quality and equivalence.

For graduate-level programs, no more than one-third of the total number of required credits may be granted to a student as transfer credit for work done at another graduate institution.

Rush University will not refuse to consider transfer credit based on the accreditation of the sending institution.

Continuing Education Units cannot be transferred in for credit.

Undergraduate courses must be completed with a "C" or better to be awarded credit.

Graduate courses must be completed with a "B" or better to be awarded transfer credit.

Only letter-graded courses are eligible for evaluation as transfer credit; pass/no-pass courses will not be considered.

Undergraduate-level courses cannot be transferred to meet the requirements of a course taught at the graduate level at Rush.

Transfer credits can only be applied to satisfy the degree requirements of one program. Once applied, they cannot be used a second time for a new degree program.

Previously earned program credits at Rush University may only be used to satisfy the requirements of another program if they are at the same level (e.g., master's or PhD) and if they meet the current curricular standards. The number of credits granted for a given course cannot exceed the number awarded for the course on the transcript of the school where the course was taken or the number earned for the corresponding course at Rush University. Credits earned on the quarter system will be converted into semester credits where applicable. A quarter credit is equal to two-thirds of a semester credit (e.g., three quarter-system credits equal two semester credits).

Course information (including grades) from transferred courses is not recorded on the student's transcript; only the number of credits is recorded and added to the cumulative number of credits.

Registration

Adding/Dropping Courses

The first Friday of the term is the last day a course can be added. A course dropped during the first week of the term will not appear on the student's transcript. After that date, one of the following applies:

- Course dropped in weeks 2–5: Grade of W will be issued for the course

- Course dropped in weeks 6–end of course: Grade of WP (Withdrew Passing), WF (Withdrew Failing), WN (Withdrew Not Passing) will be issued.
- No course may be dropped after the last day of classes or after a final evaluation of the student has been delivered. No withdrawals are allowed during the final examination period.

Rush Medical College students wishing to change their clinical schedules must contact the Office of Medical Student Programs at least four weeks before the start of the scheduled rotation.

For additional information concerning tuition refunds, please refer to Financial Affairs: Tuition Refund Policy.

Auditing a Course

A student wishing to attend a course without completing all the requirements for credit must register to audit the course with permission of the program director. If space in class is limited, continuing and new students have priority.

Registration in a course cannot be changed from audit to credit or credit to audit after the first week of the term.

Fees associated with auditing a course are listed in the Tuition and Fee Schedule.

Auditing of laboratory or clinical courses is prohibited.

An auditing student:

- May participate in class discussion only at the invitation of the course director
- Is prohibited from taking examinations
- Is expected to attend class

An audited course will appear on the student's transcript with the designation of "AU". If the student does not attend the class, a grade of "W" will be assigned.

A student who has audited a course may not apply for credit for that course at a later time. Earning a grade and receiving credit for the course can only occur by enrolling in and paying for the course during the term it is offered.

Rush Medical College does not allow students to audit Rush Medical College courses except with the permission of Committee on Student Evaluation and Promotion (COSEP).

Course Schedule

The Course Schedule is available through the RUConnected student portal. Typically, the Course Schedule will be available one week before the two-week registration period begins. The Office of the Registrar will generally send an email announcement to

students' Rush University email accounts regarding availability of the course schedule. Registration dates and deadlines are also published in the academic calendar.

Changes to the course schedule, including updates to meeting times, instructors, classrooms and added/closed/canceled courses, will be updated in RUConnected.

Independent Study

To register for independent study, the education coordinator or course instructor offering the course will approve the course and its objectives, then forward the independent study course request form, including instructor, course title, course description, number of credit hours and grading system, to the Office of the Registrar.

The Office of the Registrar will create the course in the student information system. Once the course has been created, the Office of the Registrar will contact the education coordinator or course instructor and inform them of the status of the course. The education coordinator or course instructor will inform the student when the course is available, and the student will register for the course using RUConnected.

Nursing students complete an Independent Study Contract form, which is available in the Office of the Registrar or online. On this form the objectives of the study are defined, a plan to meet those objectives is described, etc. This form should be completed and approved by the preceptor, the department chair and the program director no later than the first day of the quarter in which the independent study is to be taken. The student's preceptor keeps the contract. Health Systems Management students also complete a separate independent study form, which is available in the Department of Health Systems Management.

Registration Process

Each term the Course Schedule is available on the RUConnected student portal.

Classes are filled on a first-come, first-served basis according to the following order of priority:

1. Continuing students
2. New students
3. Students-at-large

It is the responsibility of continuing students to register using RUConnected each term during the designated two-week registration period for continuing students. Late fees may be applied to students who register outside of the designated registration period.

To register for any given term, students cannot have a registration hold (i.e., missing transcripts, missing/out-of-date immunizations, insurance waivers, financial holds, etc.). If the hold is removed before the end of the registration period, the student can register himself or herself without penalty. If the hold is not removed by the end of the registration period, the student will need to register with the Office of the Registrar as soon as the hold is resolved and will be assigned a late registration fee.

Registration is complete only when tuition and other charges for the term are paid or satisfactory arrangements for payment are made. Tuition is always due on the first day of the term.

Students who register for a class and subsequently decide to withdraw without completing an Add/Drop, Leave of Absence or Voluntary Withdrawal form will receive a failing grade (F or N) for that course.

Withdrawal/Leave of Absence

Administrative Withdrawal

Administrative withdrawal refers to a permanent departure from the University that is University-initiated and without expectation of the student's return.

Rush University requires continuous enrollment in most of its programs from the time a student matriculates through a student's graduation. Students are required to be registered each term or on an approved leave of absence. If the student has decided to withdraw from Rush, voluntary withdrawal paperwork must be submitted to the Office of the Registrar before the voluntary withdrawal will become official. A student who is not registered, is not on an approved leave of absence or has not submitted paperwork to voluntarily withdraw will be administratively withdrawn from the University at the end of the term in which the student stopped attending. The administrative withdrawal is posted to the student's transcript. Should the student wish to return to Rush in the future, the student will need to be readmitted.

Voluntary Withdrawal

Voluntary withdrawal refers to a permanent departure from the University that is student-initiated and without expectation of the student's return.

After matriculation to Rush University, a student may not arbitrarily cease registration. All students are required to maintain continuous enrollment or risk administrative withdrawal due to unexplained nonregistration.

Withdrawal implies the permanent departure from the University without the immediate expectation of return. Any student withdrawing from the University must give formal notification by completing a Petition for Withdrawal form, which requires the student to obtain specific signatures. The Office of the Registrar is the designated office that a student must notify if he or she wishes to withdraw from the University. The Petition for Withdrawal form may be obtained from the Office of the Registrar or online. The date that the student begins the process of withdrawing will be the official date used in processing the form.

No withdrawals are allowed during the final examination period. Withdrawal is also not allowed after the last class day of the term. Official withdrawal from the University entitles a student to a tuition refund from the first through the fifth weeks of the term. No other fees are refundable. The Petition for Withdrawal form must be submitted to the Office of the Registrar by Friday at 4:30 p.m. (Central Time) to be considered valid for a particular week's tuition refund.

Leave of Absence

After matriculation to Rush University, a student may not arbitrarily cease registration without notice. All students are required to maintain continuous enrollment or risk administrative withdrawal after one term due to unexplained nonregistration. Leaves of absence (LOA) are approved and granted at the discretion of the student's college and are accepted only through the first week of the term for which the LOA is desired or as otherwise approved by the college.

It is the student's responsibility to communicate directly with his or her college regarding the disposition of the request for the LOA. Students who request a LOA may be displaced into a subsequent cohort, required to take a revised program of study upon return to the University or be delayed in their progression through the program based on availability of courses and/or clinical placements.

Students may be eligible for a LOA only after they have completed and submitted the Petition for Leave of Absence required by each college or program to the Office of the Registrar. Failure to complete and submit the Petition for Leave of Absence form will make the student ineligible for any refunds and obligate him or her for the full term's insurance charges. The date that the student begins the process of applying for a Leave of Absence is the official date that will be used in processing the form.

A student who submits a Petition for Leave of Absence form after the fifth week of the term will receive grades in the courses for which he or she is registered and will be subject to an

academic progression review based upon the assigned grades. Any decision reached by the student's academic program or college supersedes the submitted Petition for Leave of Absence form.

Each degree has a time limit for completion that includes time away on a LOA. The decision to include the LOA in calculating the time limits for completion of the degree is within the discretion of each college. The maximum length of time that will be approved for a single LOA is 12 consecutive months. Each college may have a maximum length of accumulated leave of absence.

Students are responsible for registering themselves for the term in which they are returning from an approved LOA. This registration must occur during the designated priority registration period. Registration outside of this period will result in a late registration fee. It is the student's responsibility to consult with his or her advisor/program director regarding required courses for the term of re-entry. Rush Medical College students should consult with the appropriate Assistant Dean to determine required courses. Students must satisfy the conditions of the LOA before re-entering and must comply with all policies, requirements and course sequences in effect at the time of re-entry.

A request to extend a LOA requires that a new clearance form be submitted. A request to extend a LOA requires only the signatures of the student's program director, advisor or designated administrator of the college. The completed form must be submitted to the Office of the Registrar no later than the first Friday of the term for which the extension is being requested.

Students who cannot return and who do not have an extension of a LOA approved must withdraw from the institution. Students who fail to return from their LOA on the date that was originally approved risk administrative withdrawal.

Student Records

Name, Address and Phone Number Changes

Rush University requires that student academic records exist under the student's legal name.

The Office of the Registrar maintains the current official listing of student names and addresses for Rush University. It is each student's responsibility to keep the Office of the Registrar informed of changes to this information.

Name changes require official documentation verifying the new name at the time of the request. Examples of official documentation verifying a new name include valid driver's license,

marriage license (the official government document), passport, Social Security card, court order, or dissolution decree.

Privacy and Confidentiality of Student Records and FERPA

Rush University takes seriously its commitment to protect the privacy of its students and their education records. In addition to upholding the Family Educational Rights and Privacy Act of 1974 (FERPA), Rush University has taken further steps to protect a person's privacy by extending similar benefits afforded to enrolled students under FERPA to individuals who are applying for admission. If a specific privacy/confidentiality question is not answered in this text, please contact the Office of the Registrar.

Nothing in this policy may be construed to prohibit the University from disclosing information provided to the institution under the Violent Crime Control and Law Enforcement Act concerning sex offenders who are required to register.

Family Educational Rights and Privacy Act of 1974 (FERPA)

FERPA is a federal law designed to protect the privacy of students' educational records. Educational records include any information or documentation that is recorded in any way, including records produced by handwriting, computer, email, audio, video, etc. Educational records contain information directly related to a student, and are maintained by Rush University or any party acting on its behalf.

FERPA protects the privacy of students' educational records by setting forth strict instructions and limitations governing the release of information about students. Although FERPA contains exceptions for the release of "directory information" without a student's prior written consent, students have the right to request that even such directory information be withheld from disclosure to third parties.

Given the restrictions of FERPA, faculty and staff should assume that all students must provide written consent that follows the format specified in FERPA before any educational records may be released to anyone other than the student. Information cannot be released to any third party, including the students' parents, relatives, and friends. Particularly sensitive information includes students' Social Security numbers, race or ethnicity, gender, nationality, academic performance, disciplinary records, financial aid information, and grades.

Privacy During the Admissions Process

Rush University has chosen to take additional steps to protect a person's privacy by extending to individuals who are applying

for admission similar benefits afforded to enrolled students. This privacy protection covers all applicants and their application materials throughout the admissions process. The application process exists between the applicant and a Rush University admissions office; therefore, any communication about candidates and their application status to parties beyond these entities is not acceptable unless a school official has a legitimate educational interest to know this information in order to fulfill his or her professional responsibilities. All those involved in the admissions process (e.g., admissions committee members, interviewers, admissions staff, etc.) must adhere to these guidelines.

Directory Information

Rush University may establish categories of information known as directory information and release this information without student consent, upon request. Rush University designates the following personally identifiable information contained in a student's educational record as directory information:

- Student's full name
- Address (local and permanent)
- Telephone number (local and permanent)
- Rush pager number (relevant to third- and fourth-year Rush Medical College students only)
- Rush email address
- Major and minor field(s) of study including the college, division, department and/or program in which the student is enrolled
- Student's classification (e.g., junior, senior, etc.) or by number referring to such
- Dates of attendance and graduation, and degrees received
- Date and place of birth
- Photograph or other electronic images*
- Honors and awards received
- Previous colleges/universities attended
- Degrees earned at previous colleges/universities
- Rush Medical College postgraduate appointment (program/institution/state)

** Rush University records both visually and audibly many campus events and daily activities such as classes, commencement, convocations, student events, and other public occasions. These images, as well as other information about students, are published (e.g., print media; Rush website) regularly as part of the University's coverage of campus life and portrayal of the University to a variety of audiences. The University's policy is to restrict the use of any photograph/electronic image to the representation, marketing, or promotion of Rush activities only.*

Students may restrict the release of their directory information by completing and submitting the Directory Information Restrictions form available in the Office of the Registrar (or online).

The decision to restrict directory information will apply to all requests from third parties (other than those who have legal access to these data elements already), including prospective employers. A student must formally rescind a restriction of directory information by submitting a subsequent Directory Information Restrictions form.

Annual Notification of Student Rights under FERPA

FERPA affords students certain rights with respect to their educational records. These rights include:

1. **The right to inspect and review the student's educational records within 45 days of the day the University receives a request for access. If an educational record contains information about other students as well, the requesting student may inspect and review only the specific information which pertains to him or her.**

Students should submit to the University Registrar, Dean, head of the academic department, or other appropriate official, written requests that identify the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

The University may deny a request for copies of educational records when the requestor refuses to furnish proper identification and/or information required by the University.

2. **The right to request the amendment of the student's educational records that the student believes is inaccurate.**

Students may ask the University to amend a record that they believe is inaccurate. They should write the University official responsible for the record, clearly identify the part of the record they want changed, specify why it is inaccurate, and provide the accurate information. If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. **The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.**

One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic, research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee (such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks). A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

4. **The right to file a complaint with the U.S. Department of Education concerning alleged failures by Rush University to comply with the requirements of FERPA.**

The name and address of the office that administers FERPA is:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202-5901

Commencement/Graduation Activities

The Intent to Graduate form signals that a student is ready to graduate. By signing the Intent to Graduate form, the student is giving permission to the University to print the following information in any Rush graduation program and/or announce this information at any Rush graduation ceremony: the student's name as indicated on the Intent to Graduate form, any honors or awards received, the Rush degree and major the student is earning, previous colleges/universities attended, and degrees earned at those previous colleges/universities.

If a Directory Information Restrictions form was previously submitted, the student's signature on the Intent to Graduate form temporarily releases (for graduation ceremony/program purposes only) the directory information restrictions enacted by the student so that the information can be published in any Rush graduation program and/or announced at any Rush graduation ceremony. In addition, the student's signature permits Rush University to release the student's name and address to the

external photography vendor with whom Rush contracts, and to have the vendor place graduation photographs of the student on its website. The student's signature also allows the University to publish the student's picture in a picture composite and the student's image in a DVD of the Commencement ceremony that is created and distributed. The recording of the graduation ceremony could also appear on the Rush University website and/or social media sites including but not limited to YouTube and Facebook. Finally, if the student is a medical student, the student's signature permits publication of the student's name, photograph, previous degrees earned, and other information in the Rush Medical College yearbook.

If there are questions about how the information will be used for graduation or commencement purposes, please speak with the Office of the Registrar before signing and submitting the Intent to Graduate form.

Educational Records

Rush University does not maintain educational records in one central office. Educational records are maintained in the Office of the Registrar and in the respective college and department offices. Other educational records are maintained in the Office of Student Financial Aid (financial aid information, student employment), Office of Student Financial Affairs (financial account payment information), Office of International Services, and other offices. Questions regarding individual student records should be directed to the appropriate location.

Rush University will not issue copies of transcripts received from other institutions to anyone, including the student.

Deceased Student Records

Rush University may, upon the death of a student, release a student's educational records to a third party. This is done at the sole discretion of Rush University.

Mailing Lists

Rush University does not release student directory information in mailing lists, except to comply with the federal Solomon Amendment.

Additional Questions

The Office of the Registrar is the compliance office for FERPA for Rush University. If there are additional questions, please contact the Office of the Registrar at:

600 South Paulina Street, Suite 440
Chicago, Illinois 60612

(312) 942-5681
registrars_office@rush.edu



Tuition and Financial Aid

Office of Financial Affairs

- Financial Appeals
- Payment of Tuition and Fees
- Student Health Insurance
- Tuition Refund Policy
- Tuition Waivers
- Third-Party Billing

Office of Student Financial Aid

- Financial Aid Process
- Financial Aid Determination
- Financial Aid Awards
- Veterans Benefits
- Enrollment Status Definitions
- Satisfactory Academic Progress

LEAP Benefits

Tuition and Fees



Office of Financial Affairs

Financial Appeals

If a student has a concern about his or her financial account and he or she wishes to appeal the financial decision, the student must file a written appeal with the Office of Financial Affairs within two academic terms from the term in question for the appeal to be considered. The Office of Financial Affairs will investigate the situation and will consult with other offices including the Office of the Registrar, the Office of Student Financial Aid and the student's program, as needed. A decision will be rendered within one month from the time the appeal was received and the student will be notified in writing. If the decision is not in the favor of the student, the student may file a written appeal with the Office of the Associate Provost for Student Affairs. The decision of the Associate Provost for Student Affairs is final.

Payment of Tuition and Fees

The following statement represents the payment policy for all Rush University students: Charges can be viewed and payment for tuition, fees and on-campus housing can be completed through RUConnected, the University's online system. Payment can be made by credit card or e-check. If full payment of tuition cannot be made by the first week of class, as listed in the Academic Calendar, satisfactory arrangements for payment must be made with the Office of Financial Affairs. Students may not attend classes until after registration is complete. Any exception to this policy must be approved in writing by the Associate Provost for Student Affairs.

Students have the responsibility to complete one or a combination of the following courses of action on or before the first Friday of classes each term:

1. Pay total tuition, fees and on-campus housing charges for the term.
2. Complete a Deferred Payment Plan Contract. This plan requires that the first payment and a \$15 service charge be paid on or before the first Friday of the term. Additional payments are due every four weeks. The length of the contract is dependent on the length of the term. Contact the Office of Financial Affairs to set up a payment plan.
3. Use the pending financial aid payment option. All students who have financial aid pending will be allowed to defer payment of that portion of tuition and fees that is covered by the anticipated aid. In order to use this option, students must have taken all steps required of them to apply for the aid (e.g., the application for a guaranteed student loan program

must have been completed and submitted to the Office of Student Financial Aid). In order to avoid a late fee charge, students must make arrangements for payments of that portion of tuition and fees not covered with pending aid by completing steps one or two above.

Failure to follow one of the steps above will result in a \$100 late fee. Students who choose the deferred payment plan contract and who fail to make a payment by the specified due dates will result in a \$50 late payment fee for each payment date missed.

At the end of the academic term, those students who still have outstanding balances with Rush University that are not covered by pending financial aid will:

- Not receive transcripts/diplomas
- May be dismissed from on-campus housing
- Lose all university privileges
- Not be allowed to register for the following term

Student Health Insurance

Rush University requires students to be covered by a health plan in order to promote health and well-being while protecting the individual from undue financial hardship that a medical emergency could cause. Non-Rush Medical College students must provide proof of existing coverage before registering for the Fall term each year. Students who do not submit proof and receive confirmation of verification of their coverage will be enrolled in the student health insurance plan and charged for the premiums for the term. To that end, students enrolled in degree programs are eligible for the Student Health Insurance Plan offered by Academic HealthPlans, Inc. and Blue Cross and Blue Shield of Illinois.

For the 2015-2016 school year, the cost of the plan is approximately \$3,086.00 per academic year for single coverage. Additional coverages are available as follows: each child (additional \$3,086.00 per year), and spouse (additional \$3,086.00 per year). This plan allows students to choose a primary care physician from a large list of members of the Preferred Provider Plan (PPO) in the Greater Chicago area. When using a Network Provider, there is an annual deductible of \$250 and coverage of 80 percent for most patient services including hospitalization and surgery, as well as outpatient services such as office visits, laboratory and X-ray. Preventative care services are covered at 100 percent. When using a pharmacy in the Prime Therapeutics Network, there is a \$20 co-pay for generic prescriptions, a \$50 co-pay for brand name prescriptions and an \$80 co-pay for brand name prescriptions when generic is available.

An optional dental insurance plan is also available to all Rush University students. Details of the plan are available in the Office of Financial Affairs. Enrollment for the dental plan is available at the beginning of the fall term only. Applications will not be accepted after the start of the fall term.

Student Insurance Plan Rates for the 2015-2016 Academic Year

Medical	Approx. Yearly Rate
Student	\$3,086.00
+Spouse	\$3,086.00
+ Each Child	\$3,086.00
Dental	Approx. Monthly Rate (2015-2016 rates)
Student Plan	\$21.36
Student + One Plan	\$41.86
Family Plan	\$79.85

Details of the plans are available in the Office of Financial Affairs or online at the Rush University Information for Students page located on the Financial Affairs web page.

A small portion of fees for Rush Medical College students has been allocated to the Medical Student Health Service Program, supported by Lifetime Medical Associates (1645 W. Jackson, Suite 215). The Medical Student Health Service Program is designed to work seamlessly with Rush University Health Insurance to provide medical students with acute care. By using Rush University Health Insurance, medical students should experience an enhanced level of service and minimal billing problems, with a \$20 fee per office visit. This will provide the type of Student Health Service with which most students are familiar. Additionally, all Rush Medical College students are covered under a blood and bodily fluids exposure rider. This works as a supplemental policy to any health insurance to cover treatment or medications necessary as the result of a needle stick, splash or potentially contagious diseases exposure. Together with the basic Rush University Health Insurance policy, the rider will completely cover prophylactic medications or injections.

Rush Medical College students will be assessed a fee for vaccinations/immunizations and documentation. This fee covers any necessary blood tests, vaccinations or updates as well as costs associated with maintaining the documentation of their

compliance and communicating that information to the Rush system hospitals and any away elective locations that may request certification of immunization and vaccination status.

Tuition Refund Policy

Official withdrawal or dismissal from a course or from the University entitles a student to a refund of tuition according to the following schedule. Fees are not refundable. A student may receive a 100% refund if withdrawal occurs during the first calendar week in which the term begins. Otherwise, refunds will be made as follows:

- Second week: 80% refund
- Third week: 60% refund
- Fourth week: 40% refund
- Fifth week: 20% refund
- After fifth week: no refund

Alternate Refund/Grading

This alternate refund/grading policy does not apply to Rush Medical College students.

Pure Compressed Weekend Course

(Fri/Sat/Sun w/o any pre- or post- class work)

- Before first class meeting: 100% and not transcribed
- After first class meeting: no refund and W grade

2-Week Course

- Before first class meeting: 100% and not transcribed
- Week 1: 50% refund and W grade
- Week 2: no refund and WP/WF/WN grade

5-Week Course

- Before or during week 1: 100% and not transcribed
- Week 2: 50% and W grade
- Weeks 3–5: no refund and WP/WF/WN grade

Refunds will be shown as credits on the student's account. A check for the amount of refund, less any amount still owed for other charges, will be sent to the student. Normally, checks are processed within two weeks and mailed to the student's address on RUConnected. Students wishing to appeal the published schedule of refunds must appeal in writing to the Associate Provost, Student Affairs.

Tuition Waivers

Rush Medical College Students Enrolling in Courses Offered by the Graduate College

Rush Medical College students who take a leave of absence from their MD program may enroll in Graduate College classes as part of a formal MS or PhD program, or simply for additional knowledge. Medical students are exempt (tuition waiver) from the additional tuition costs associated with enrollment in these classes.

Doctoral Students in the Graduate College

The Graduate College offers a full tuition scholarship for students enrolled in doctoral program in the basic sciences (Anatomy and Cell Biology, Biomechanics, Biochemistry, Immunology/Microbiology, Medical Physics, Molecular Biophysics and Physiology, Neuroscience and Pharmacology). The scholarship is only for tuition. Health insurance and other fees are the student's responsibility. To receive this scholarship, students must maintain full-time status. A requirement of at least 12 hours per quarter is needed to be a full-time student. If a student fails to register for 12 hours each quarter, the scholarship is rescinded and the student is billed tuition. In addition, most students accepted by the Graduate College receive a stipend. The stipend awarded to a graduate student is a privilege and is contingent upon policies established by individual divisions.

Master of Science Students in The Graduate College

Students enrolled in master's programs in the basic sciences (Anatomy and Cell Biology, Biochemistry, Biomechanics, Biotechnology, Immunology/Microbiology, Medical Physics, Neuroscience and Pharmacology) pay tuition and fees. Master's students are generally not eligible for tuition scholarships and are expected to be enrolled full-time (12 hours per quarter) unless special arrangements have been made.

Third-Party Billing

If the student will not be personally paying his or her account, it is the student's responsibility to forward any bills to the appropriate party as soon as possible.

Office of Student Financial Aid

Financial Aid Process

Instructions for accessing financial aid information on the Rush University website are emailed to all newly accepted students prior to enrollment. The Student Financial Aid website contains in-depth information on policies, procedures and financial aid

awarding methodology. The priority deadline for submission of financial aid application materials is March 1 for continuing students and new students starting in the fall. Students starting in a term other than fall should submit financial aid application materials at least two months prior to their start date. Students must be enrolled at least half-time and must be in a degree or approved certificate program to receive financial aid. To receive assistance, all appropriate forms and materials must be on file. Students should expect to receive the majority of assistance in the form of loans. Because of limited institutional funding, financial aid awards will likely contain loans that accrue interest while the student is in school. For students in the Medical College and nursing students in the Generalist Entry Master's (GEM) program, need-based grant assistance is available through the Office of Student Financial Aid. However, the funds are limited and all applicants (with few exceptions) must provide parental data and meet the institutional criteria for eligibility. Refer to the Office of Student Financial Aid website (<http://www.rushu.rush.edu/finaid/>) for details.

Undergraduate students who have not received a prior bachelor's degree are more likely to receive grant assistance through federal and state need-based programs. Employment through the Federal Work-Study program may be possible throughout Rush University Medical Center. Depending on a student's academic program, Federal Work-Study assistance may be awarded as part of the financial aid package. It is the student's responsibility to secure employment. The Office of Student Financial Aid assists students in locating jobs within the Medical Center.

Financial Aid Determination

Financial assistance programs at Rush University are provided to assist students who cannot otherwise afford to pay the full cost of education on their own. In general, financial need is the basic criterion for the awarding of funds. Accordingly, students and their families will be expected to contribute toward educational expenses to the fullest extent possible. The level of the expected contribution is determined by using a standard set of criteria to analyze financial information provided by students and their families. Submission of parental data for institutional grants and loans is required for students in the Medical College and nursing students in the Generalist Entry Master's (GEM) program. Complete information about this policy is found on the Office of Student Financial Aid website. Student Financial Aid counselors are available to consult with students and parents (with the student's authorization) on all matters regarding the financing of a Rush University education. Students and authorized parents are welcomed and encouraged to make use of these services.

Financial Aid Awards

After evaluating student and family resources and assistance from outside the University, the Office of Student Financial Aid will award federal, state and institutional funds (as appropriate) to students with demonstrated financial need. In varying quantities, a financial aid award may include grants, loans and student employment. In order to distribute the available funds in the most equitable manner, the Office of Student Financial Aid establishes a formula that designates the sequence in which funds are awarded to students and the maximum amount awarded under each program. The formula provides for a specific amount of loans and employment before students are considered for grants. These formulas are applied consistently during any given year among all students at a given class level and in a given college (pending availability of funds). Due to differences in the availability of funds from year to year and changes in eligibility requirements, the formulas are adjusted annually.

Veterans Benefits

Rush University participates in federal Veterans Education Benefits through the U.S. Department of Veterans Affairs (VA).

Post-9/11 GI Bill

Provides tuition, fees, books/supplies and housing assistance to eligible veterans. Tuition and fees are paid directly to Rush by the VA. Tuition and fees assistance is capped at the national maximum of \$21,084.89 per academic year. Benefit rates vary based on the veteran's circumstances. Some veterans may be able to transfer their benefits to a dependent.

Yellow Ribbon Program

Effective with the 2012–2013 academic year, certain colleges within Rush University participate in the Yellow Ribbon Program. Veterans entitled to the maximum benefit rate are eligible to apply for additional tuition and fees amounts if their costs exceed the \$21,084.89 cap. The amount of additional assistance available and the number of students able to be supported is limited and varies by college. Funds will be awarded on a first-come, first-served basis. Students who have received Yellow Ribbon assistance will have preference for these funds in future academic years. Details are available on the VA's Yellow Ribbon Program information site.

Montgomery GI Bill—Active Duty (MGIB-AD Chapter 30)

Monthly benefit paid directly to the veteran

Montgomery GI Bill—Selected Reserve (MGIB-SR Chapter 1606)

Monthly benefit paid directly to the veteran

Reserve Educational Assistance Program (REAP Chapter 1607)

Monthly benefit paid directly to the veteran

Veterans Educational Assistance Program (VEAP Chapter 32)

Monthly benefit paid directly to the veteran

Survivors and Dependents Assistance (DEA Chapter 35)

Monthly benefit paid directly to the survivor or dependent of the veteran

If a student qualifies for participation in more than one Veterans Education Benefits program, the VA website provides a comparison tool to help determine which benefits might be appropriate.

Veterans interested in using their benefits at Rush for the first time should:

1. Apply for benefits through the VA: If the veteran has never used veterans benefits at an institution before, this step must be completed.
2. Submit form 22-1995 or form 22-5495 (as appropriate) online: If the veteran has used veterans education benefits before, but is a first-time benefits user at Rush University, the appropriate form must be submitted.
3. Provide a copy of their eligibility letter from the VA (as well as any change of program forms from step 2, above) to the Office of Student Financial Aid before benefits can be certified with the VA.

All documents can be mailed, faxed or scanned and emailed to the Office of Student Financial Aid. Please be sure to indicate name and student ID number (or Social Security number) on all documents.

Enrollment Status Definitions

Students working toward a degree or certificate and who are enrolled at least half-time may be eligible for student financial assistance. These students may also be eligible to have their federal educational loans deferred. Students are considered full-time or half-time based on the below criteria.

	Full-time	Half-time
Medical Students	All enrolled students are considered full-time	
Graduate Students	9	4.5
PhD Dissertation Students	2	1
Undergraduate Students	12	6

Full-Time Registration for PhD Students

A full-time PhD student is one who is matriculated and meets the conditions for each term noted below:

- Registers for nine or more graduate credit hours in an academic term; or
- Registers for a minimum of two hours of dissertation coursework in a fall, spring, or summer term. Note: A student may register for additional courses as needed or required, but if registering for less than nine hours, this must include a minimum of two hours in dissertation hours to be considered full-time.

A student must be registered for one of the above-defined statuses during fall, winter, spring or summer term sessions to maintain status as a full-time matriculated student. Individual graduate programs may set guidelines on research enrollments; including which academic milestones should be passed before enrolling in dissertation hours are permitted. Once students successfully defend their dissertation, no further research enrollments are necessary or allowable, and graduation should not be deferred.

- Each student will be allowed one term of enrollment to finalize all work related to the defense of their dissertation. During this term, the student should apply for graduation, and graduation should not be deferred beyond this point.

Effective fall 2015, all dissertation courses will be corrected to be similarly named following university guidelines and hold fixed credit hours starting at a minimum of 2.0, thereby always conferring full-time status.

Students should contact the Office of Financial Aid about full-time status for financial aid purposes.

Satisfactory Academic Progress

The Higher Education Act of 1965 as amended by Congress mandates institutions of higher education to establish minimum standards of satisfactory progress for students receiving federal financial aid. These standards apply to all Federal Title IV aid programs including the Federal Pell Grant, Federal Supplemental Educational Opportunity Grant, Federal Perkins Loan, Federal Stafford Loan, Federal PLUS Loan and Federal Work-Study programs.

Accordingly, the Department of Education regulations require that Rush University's Office of Student Financial Aid monitor the academic progress of all financial aid recipients toward the completion of their degree. This process is called Satisfactory Academic Progress (SAP).

This SAP policy is enforced in conjunction with all other institutional policies and procedures, including the academic progressions policies of Rush University's colleges and academic programs. For undergraduate and graduate students, the below criteria are checked at the end of each term. For medical students, the below criteria are checked annually at the end of spring term.

Enforcement

The Office of Student Financial Aid shall have primary responsibility in enforcing the SAP policy. The Office of the Registrar and other Rush University offices that maintain student information relevant to the SAP policy shall provide such information, as requested by the Office of Student Financial Aid.

SAP Requirements

SAP requirements vary by academic level (undergraduate, graduate and medical students). Please refer to the appropriate section to find the requirements that fit your academic program.

UNDERGRADUATE STUDENTS

SAP for undergraduate students is monitored using three factors: maximum time frame measurement, pace of completion and cumulative Grade Point Average (GPA). SAP is measured at the end of each academic term once final grades are submitted.

Maximum Time Frame Measurement

Students may attempt up to 150 percent of the credits it normally takes to complete the program. The total allowable attempted hours are calculated by multiplying the hours required to complete the degree at Rush (excluding the general education courses required prior to entry in the program) by 1.5 and rounding down to the nearest whole number. For example, for a program that requires 107 credit hours to receive a degree at Rush (not including the general education courses required prior to entry in the program), a student may attempt up to 160 hours.

Pace of Completion

Students must successfully complete at least 67% of the courses they attempt. This measure will be measured cumulatively over the course of the student's program. For the purpose of this measurement, all of the following are applicable.

- Successful completion is defined as a grade of A, B or C for a letter grade course, or a grade of P for a course that is pass-fail or pass-no pass. These courses are counted in both the attempted and completed hours totals.
- Proficiency credit ("K" grades) is counted in both the attempted and completed hours totals.

- All other grades (including incomplete grades) are counted in the attempted hours total, but not in the completed hours total. If an incomplete grade is later converted to a grade that is considered to be a successfully completed grade, the pace of completion percentage can be recalculated. It is the student's responsibility to notify the Office of Student Financial Aid when an incomplete grade has been converted.
- Students who drop courses but who remain enrolled at the University will not have those dropped courses counted in the attempted hours total if they are dropped prior to the census date. Dropped courses after the census date will be counted in the attempted hours total.
- Repeated courses are counted as attempted hours during all attempts.
- Transfer credits that count toward the student's current academic program count as both attempted and completed hours.
- Students who change majors will only have hours that were previously attempted counted in their cumulative totals if they are applicable to the new academic program.

Cumulative Grade Point Average (GPA)

Undergraduate students must maintain a minimum cumulative GPA of 2.0. Students who have a term GPA of less than 1.0 after their first term at Rush will be immediately placed on financial aid suspension.

GRADUATE STUDENTS

SAP for graduate students is monitored using three factors: maximum time frame measurement, pace of completion and cumulative Grade Point Average (GPA). SAP is measured at the end of each academic term once final grades are submitted.

Maximum Time Frame Measurement

Students may attempt up to 150 percent of the credits it normally takes to complete the program. The total allowable attempted hours are calculated by multiplying the hours required to complete the degree at Rush by 1.5 and rounding down to the nearest whole number. For example, for a program that requires 113 credit hours to receive a degree at Rush, a student may attempt up to 169 hours.

Please note: nondegree certificate programs are approved by the U.S. Department of Education for financial assistance at a specific number of credit hours. Regardless of a student's actual plan of study, maximum time frame is calculated using the number of hours for which the program was approved with the U.S. Department of Education.

Pace of Completion

Students must successfully complete at least 67% of the courses they attempt. This measure will be measured cumulatively over the course of the student's program. For the purpose of this measurement, all of the following are applicable.

- Successful completion is defined as a grade of A or B for a letter grade course, or a grade of P for a course that is pass-fail or pass-no pass. These courses are counted in both the attempted and completed hours totals.
- Proficiency credit ("K" grades) is counted in both the attempted and completed hours totals.
- All other grades (including incomplete grades) are counted in the attempted hours total, but not in the completed hours total. If an incomplete grade is later converted to a grade that is considered to be a successfully completed grade, the pace of completion percentage can be recalculated. It is the student's responsibility to notify the Office of Student Financial Aid when an incomplete grade has been converted.
- Students who drop courses but who remain enrolled at the University will not have those dropped courses counted in the attempted hours total if they are dropped prior to the census date. Dropped courses after the census date will be counted in the attempted hours total.
- Repeated courses are counted as attempted hours during all attempts.
- Transfer credits that count toward the student's current academic program count as both attempted and completed hours.
- Students who change majors will only have hours that were previously attempted counted in their cumulative totals if they are applicable to the new academic program.

Cumulative Grade Point Average (GPA)

Graduate students must maintain a minimum cumulative GPA of 3.0. Students who have a term GPA of less than 2.0 after their first term at Rush will be immediately placed on financial aid suspension.

RUSH MEDICAL COLLEGE STUDENTS

SAP for Rush Medical College students is monitored using three factors: maximum time frame measurement, pace of completion and grade requirements. SAP is measured at the end of each academic year once final grades are in and at the time of awarding.

Time Limits on Financial Aid Eligibility

The normal time frame for completion of required coursework for the MD degree is four academic years. Due to academic or personal difficulties, a student may require additional time.

In such situations, the Rush Medical College Committee on Student Evaluation and Promotion (COSEP) may establish a schedule for the student that departs from the norm and that may require repeating a year of study. For the purposes of this financial aid policy, no more than three years may be devoted to the first- and second-year curriculum. No more than three years may be devoted to the third- and fourth-year curriculum. Summer enrollment, if required, is considered part of the academic year for the purposes of this measure. Approved Leaves of Absence do not count in this measure.

Completion of Requirements/Pace of Completion

1. First-year students must complete at least 66% of their first-year curriculum with a grade of "Pass" or better between the start of the year and the last day of spring quarter exams. This includes repeated courses.
2. To advance to the second year, students must complete all first-year courses with a grade of "Pass" or better by the start of the second year.
3. Second-year students must complete at least 66% of their second-year curriculum with a grade of "Pass" or better between the start of fall quarter and the last day of spring exams. This includes repeated courses.
4. To advance to the third year, students must complete all second-year courses with a grade of "Pass" or better by the start of the Clinical Resources and Skills for the Hospital (CRASH) course.
5. A student who is repeating/splitting the first or second year according to a COSEP schedule is considered to be making SAP.
6. Third-year students must complete at least 66% of the clerkships they attempt with a grade of "Pass" or better.
7. To advance to the fourth year, students must complete all core clerkships with a grade of "Pass" or better.
8. A student who is repeating the third or fourth year according to a COSEP schedule is considered to be making SAP.

Grade Requirements

Academic progress in Rush Medical College is measured in terms of Honors, High Pass, Pass and Fail grades. A student must complete each required course/clerkship with a grade of "Pass" or better in order to graduate. A student who fails a course must retake it and earn a grade of at least "Pass." A student who receives an Incomplete in a course must complete the course and earn at least a "Pass."

Financial Aid Warning

Undergraduate and graduate students are allowed a financial aid warning period. Professional students (Rush Medical College) are not allowed a financial aid warning period.

Undergraduate or graduate students who fail to meet the requirements of this satisfactory academic progress policy will be placed on financial aid warning for one additional term (with the exception of undergraduate students who have a first-term GPA of less than 1.0 and graduate students who have a first-term GPA of less than 2.0; in this case, that student would immediately be placed on financial aid suspension). Students will be allowed to continue on financial assistance during the warning period. Students placed on financial aid warning will be sent notification by hard-copy letter (through the U.S. Postal Service) and through their Rush email account. The notification will include SAP requirements, steps necessary to meet SAP in the upcoming term and the consequences for failing to meet SAP requirements by the end of the warning period.

Students will be placed on financial aid suspension if they fail to meet the standards of this SAP policy after the one-term financial aid warning period.

Suspension of Financial Aid Eligibility

- Professional students (Rush Medical College) who fail to meet the requirements of this SAP policy will be placed on financial aid suspension.
- Undergraduate students who have a first-term GPA of less than 1.0 and graduate students who have a first-term GPA of less than 2.0 will be placed on financial aid suspension.
- Students who still fail to meet the requirements of this policy after their single term on financial aid warning will be placed on financial aid suspension.

Students who are suspended from financial aid eligibility will be notified by hard-copy letter (through the U.S. Postal Service) and through their Rush email account.

Appealing Suspension of Financial Aid Eligibility

A student may appeal the suspension of financial aid eligibility for extenuating circumstances. Appeals from other parties on behalf of the student will not be accepted. All appeals should be submitted to the Director of Student Financial Aid in writing. Each appeal must include: 1) the reasons why the standards of this policy were not met, 2) what has changed in the student's situation that will allow the student to make satisfactory progress during the next evaluation, and 3) an academic plan for the remainder of the student's studies. Documentation of any

statements made in the appeal should be included, as appropriate. *All appeals must be submitted within 10 business days of receipt of a suspension notice.*

The Director of Student Financial Aid will review the appeal and will respond to the student within 10 business days from the receipt of the appeal. Students whose appeals are approved will be placed on a financial aid probationary period for one term or for the duration of an academic plan developed by the student’s advisor, as appropriate. The probationary period will be defined to include checkpoints that must be achieved in order for the student to remain eligible for financial assistance. Students failing to abide by the terms of their probationary period will be suspended from financial aid after their probationary period.

The decision of the Director of Student Financial Aid is final, binding and not subject to further appeal.

Reinstatement of Financial Aid Eligibility

A student’s eligibility for financial aid will be reinstated at such time as the student successfully meets the standards

of the SAP policy. It is the student’s responsibility to present evidence to the Student Financial Aid Office at the time the student meets the requirements for reinstatement.

LEAP Benefits

All full-time employees (72 to 80 hours per pay period) can receive prepayment up to nine credit hours per term. Part-time employees (40 to 70 hours per pay period) can receive prepayment up to six credit hours per term. New employees must complete three months of employment prior to requesting prepayment of tuition. Books and fees are not included in the prepayment cost.

A copy of the letter of acceptance from Rush University must be turned into the LEAP office at the beginning of the LEAP prepayment assistance. The LEAP paperwork must be turned into the LEAP office before the final deadlines listed below.

LEAP Deadlines

	FA 15	WI 16	SP 16	SU 16
College of Nursing	*8/21/15 **8/31/15	*12/28/15 **1/4/16	*4/22/16 **5/2/16	
College of Health Sciences	*9/4/15 **9/14/15	*12/28/15 **1/4/16	*3/18/16 **3/28/16	*6/10/16 **6/20/16
The Graduate College	*8/21/15 **8/31/15	NA	*12/28/15 **1/4/16	*5/6/16 **5/16/16

*Priority Deadlines

**Final Deadlines

A passing grade (defined as a “C” or better per class for undergraduates and a “B” or better per class for graduates) must be obtained to continue receiving LEAP prepayment benefits. If you receive a non-passing grade, you will not receive tuition credit for the number of credit hours your non-passing grade was worth. The LEAP office will obtain grades from Student Affairs.

As of January 2002, federal tax law mandates that prepaid tuition for degree-level coursework in excess of \$5,250 be considered additional taxable earnings in the calendar year (January–December) in which it was received. The amount of prepaid tuition benefits that exceeds \$5,250 will be added to the employee’s biweekly earnings and taxed based on the employee’s payroll tax elections. It is the responsibility of Rush University Medical Center, at the end of each term, to withhold taxes based on this federal tax law, Section 127.

Tuition and Fees (2015-2016)

Tuition and fees for the 2015-2016 academic year are listed below. For estimates of other expenses, see the Office of Student Financial Aid website.

College of Nursing	Flat Rate (per term)	Per-Credit Rate
Tuition, All Nursing Academic Programs	\$11,361 (12+ credits)	\$999 (1–11 credits)
Tuition, RN First Assist (RNFA) Course Series	N/A	\$700

The Graduate College	Flat Rate (per term)	Per-Credit Rate
Biotechnology	\$15,500	N/A
Health Sciences (PhD)	N/A	\$600
Nursing (PhD) – Trimester	\$11,361 (12+ credits)	\$999 (1–11 credits)
All Other Graduate College Academic Programs	\$12,844 (13+ credits)	\$988 (1–12)

College of Health Sciences	Per Credit Rate (Unless Otherwise Noted)
Undergraduate Programs	
Health Sciences	\$500
Imaging Sciences	\$562
Medical Laboratory Science	\$533
Perfusion Technology	\$601
Respiratory Care	\$574
Vascular Ultrasound	\$562
Graduate Programs	
Audiology	\$608
Clinical Laboratory Management	\$592
Clinical Nutrition	\$699
Health Systems Management	\$702
Medical Laboratory Science	\$592
Occupational Therapy	\$581
Perfusion Technology	\$645
Physician Assistant Studies (1st Year Students)	\$633
Physician Assistant Studies (2nd Year Students)	\$7,913/term
Physician Assistant Studies (3rd Year Students)	\$6,330/term
Research Administration	\$592
Respiratory Care	\$592
Specialist in Blood Bank	\$592
Speech-Language Pathology	\$608

Rush Medical College*	Per Term	Per Year
M1	\$25,150	\$50,300
M2	\$24,892	\$49,784
M3	\$24,892	\$49,784
M4	\$24,892	\$49,784

Students-at-Large Continuous Enrollment Fee	See per-credit rates listed above Per Term
M1	\$4,276
M2	\$4,276
M3	\$4,276
M4	\$4,276
All Other Programs	Students are charged at the per-credit rate equivalent to one quarter hour for their programs.

Admissions Fee

A non-refundable application fee is required of all applicants to offset the expense of processing the application, evaluating credentials and maintaining a library of evaluation aids. This fee does not apply to any other charges such as tuition.

Enrollment Deposit

The enrollment deposit fee holds a place for the student in the entering class. The deposit is non-refundable and is applied toward payment of the first term tuition. A \$250 enrollment deposit is required for students in the College of Health Sciences. Rush Medical College students are required to pay \$100 prior to matriculation. College of Nursing students and affiliated students must deposit \$350 prior to matriculation. The enrollment deposit for PhD in nursing students is \$350. The enrollment deposit for all basic sciences and biomedical research programs within the Graduate College is \$250.

Late Registration Fee

Continuing students must register during the official two-week registration period. Students registering after the registration period ends will incur the \$50 late registration fee. An additional \$50 late registration fee will be applied to the student's financial account if the student has not registered by the end of the first day of the term.

A student who feels that there are mitigating circumstances as to why the late registration fee should not be applied must first appeal to his or her advisor. If the advisor deems that the information warrants repealing the late registration fee, the advisor must speak with the program director. If the program director concurs with the advisor, the program advisor will notify the Office of the Registrar in writing and the late fee will be removed from the student's financial account by the Office of Financial Affairs.

Continuous Enrollment Fee

Students enrolled in a noncredit residency or academic enrichment program prior to receipt of their degree must be registered for Continuous Enrollment in order to retain their student status. Any degree or certificate student not taking courses but needing to replace an outstanding incomplete grade must register for Continuous Enrollment until the grade is satisfied. This fee also applies to graduate students who have completed all courses but have not had the dissertation accepted. Hospitalization or physician fees are not covered in this fee. Students auditing a course may be required to register for the continuous enrollment course (see "Auditing a Course").

Returned Checks

If a student gives the University a check that is returned by the bank upon which it was drawn, marked "not sufficient funds," "payment stopped," or "account closed," a \$25 charge will be assessed for each occurrence.

Rush Medical College Students and Tuition Charges

Rush Medical College students are charged for a maximum of four years of full-time tuition. Medical students needing additional terms to complete degree requirements will be charged the continuous enrollment fee. Although it may be possible for a medical student to complete all degree requirements prior to the spring term of his or her fourth year, a full four years of tuition charges must be paid prior to graduation.

Auditing a Course

Students who are registered in classes for credit and who wish to audit a separate class or classes will not be charged for the audited course(s). If the student only wishes to audit one or more classes and will not be registered in any classes for credit for that term, the student must register in continuous enrollment, at which point one credit hour of charge will be assessed at the student's normal tuition rate.

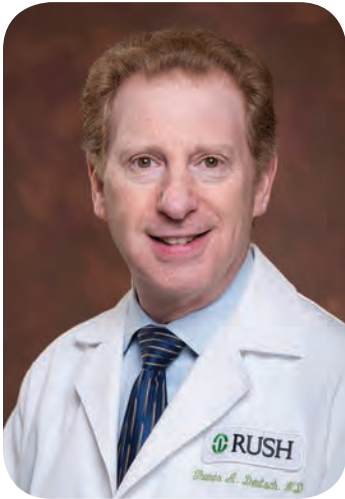


RUSH UNIVERSITY

Rush Medical College



Welcome to Rush Medical College



It has been my honor to serve as Dean of Rush Medical College since 2002. I graduated from Rush in 1979 and, following a residency in ophthalmology, I returned to Rush in 1984, becoming the third generation in my family to serve here. I hope you will become as much a part of the Rush family as I have.

Chartered in 1837, Rush Medical College has been a part of the Chicago landscape longer than any other health care institution. Since then, while some of our educational process has changed, Rush's best traditions continue: hands-on learning, an unparalleled commitment to community service, and experiences supported by outstanding clinical role models. Rush Medical College is a family of over 2,600 faculty and staff, 525 medical students and 620 residents and fellows. Among the most popular aspects of Rush Medical College are our co-curricular opportunities. The

Rush Community Service Initiatives Program is an opportunity to participate in community service projects, including care at free clinics, tutoring and health care teaching. Over 90% of our students are involved. In addition, approximately one-third of our first-year students participate in Dean's Office Summer Research Fellowships.

Rush has produced skilled leaders in medicine and science, and thousands of excellent physicians. Explore our website and that of Rush University Medical Center to discover the myriad opportunities that Rush Medical College offers in medical education, in clinical care and in biomedical research. Please let us know if we can help you in any way.

Thomas A. Deusch, MD

Henry P. Russe, MD, Dean of Rush Medical College

Rush Medical College: Mission

The mission of Rush Medical College is to deliver outstanding medical education focused on patient care, research and community service. Our diverse students learn in a practitioner-teacher model, which promotes collaboration, accountability and respect. We graduate physicians who are dedicated to the pursuit of excellence in clinical practice, research and service through continuous learning.

Rush Medical College: Terminal Objectives

The Rush Medical College terminal objectives are key learning objectives that students achieve by the time of graduation from the medical college program.

Terminal objectives illustrate Rush Medical College's commitment to our students, and are written as outcome statements of competencies deemed critical to a successful physician. The terminal objectives direct all curriculum and assessment, as all course and session objectives ultimately serve the terminal objectives.

The terminal objectives are grouped under six domains which parallel those used by the Accreditation Council for Graduate Medical Education (ACGME). The domains and terminal objectives include:

1. Patient Care

In their patient care, students must:

- Complete comprehensive evaluations of patients
- Develop appropriate treatment plans
- Apply the principles of health promotion

2. Medical Knowledge

Students must:

- Demonstrate knowledge of the basic, clinical and social sciences related to medical practice
- Apply the knowledge of basic, clinical and social sciences to patient care

3. Interpersonal and Communication Skills

Students must:

- Communicate and collaborate effectively with patients, families and other health care providers
- Function as a member of the health care team

4. Putting Care in a Practical Context

Students must:

- Be respectful of the diversity of patient backgrounds, beliefs and values

- Analyze the environmental and contextual factors that influence a patient's health, disease and access to health care
- Engage the resources of the health care system to enhance patient care

5. Self-Directed and Lifelong Learning

Students must:

- Address personal learning needs
- Appraise scientific evidence that supports patient care practices

6. Professionalism

Students must:

- Display compassion and empathy when interacting with patients and their families
- Adhere to the professional responsibilities outlined by Rush Medical College
- Demonstrate the professional values of medical practice

The terminal objectives are supported by year-specific objectives so that course work in each year of the curriculum builds upon skills, knowledge, and attitudes needed to achieve the terminal objectives. A review of the terminal objectives can help students gauge their progress in the curriculum, and potentially guide elective selection when the time comes.

Rush Medical College: Admissions Process

Applying to Rush Medical College

Rush Medical College utilizes the American Medical College Application Service (AMCAS), for its primary application. Detailed information and application materials are available on the Association of American Medical Colleges website (<https://www.aamc.org/students/applying/amcas/>). Each applicant who submits an AMCAS application to Rush Medical College will receive a secondary application invitation by email. The secondary application requires a nonrefundable fee of \$100.00 and must be submitted in its entirety no later than December 31.

Required Criminal Background Check

As a medical school located in Illinois, Rush Medical College will enforce the Medical School Matriculant Criminal History Records Check Act, which states: a medical school located in Illinois must require that each matriculant submit to a fingerprint-based criminal history records check for violent felony convictions and any adjudication of the matriculant as a sex offender conducted by the Department of State Police and the Federal Bureau of Investigation as part of the medical school admissions process.

Each year beginning January 1, an applicant screening provider will procure a background check on applicants at the point of their first acceptance. Upon completion of this process, the report procured during the process will be released to Rush Medical College.

Required Drug Screening

In preparation for clinical rotations at John H. Stroger, Jr. Hospital of Cook County, all Rush Medical College students are required to submit a urine sample under conditions arranged by Rush Medical College for a drug screening (effective with the first year class entering in 2015). First-year students will be tested during orientation through a process coordinated by the Student Health Service (Lifetime Medical Associates). Upon completion of the testing process, a report will be released to Rush Medical College.

A positive result from the Criminal Background Check, the Sex Offender Assessment, and/or the Drug Screen will result in the applicant's file being presented to the Committee on Student Evaluation and Promotion (COSEP) for review and action. If the COSEP verifies there is a positive result on the Criminal Background Check, the Sex Offender Assessment, and/or the Drug Screen, Rush Medical College may rescind the student's acceptance.

For additional information, visit the Rush Medical College Admissions website (<http://www.rushu.rush.edu>).

Rush Medical College: Diversity and Inclusion Statement

Rush Medical College embraces the Rush University Medical Center Diversity Leadership Council vision for diversity and the American Association of Medical Colleges' commitment to increasing diversity in medical schools. Recognizing that diversity and inclusion enhance the medical education environment and ultimately the overall health of our community, Rush Medical College seeks to create and support an environment in which faculty, staff, and medical students combine their differing backgrounds, diverse perspectives, and unique skills as they work with peers to solve problems, enhance their ability to work with patients, and develop new, effective ways to manage health, conduct research, and deliver care.

Rush Medical College strives to enroll a highly qualified and richly diverse student body through holistic review and individual consideration of the potential contributions that applicants with different backgrounds, cultures, perspectives, races,

ethnicities, characteristics, and personal experiences would make to the educational experience of all students and to the school's cultural, social, and learning environment. Rush Medical College seeks to attain a learning environment that better reflects its community through increased representation of groups that are underrepresented in medicine in Rush Medical College's surrounding communities. Along with remaining committed to applicants from backgrounds traditionally underrepresented in medicine, Rush Medical College considers diversity in economic, geographic, gender, age, sexual orientation, racial and ethnic backgrounds as important factors in not only creating a diverse community but also influencing an applicant's potential to succeed as a physician in our rapidly changing and diverse society.

To this end, the Rush Medical College Committee on Admissions annually identifies factors for consideration in building a diverse student body. Further, Rush Medical College's Faculty Council, utilizing information provided by the Committee on Admissions and other data, is committed to implementing programs and initiatives designed

Technical (Non-academic) Standards for Admission and Promotion

Reviewed by Committee on Admissions, 2012

Reviewed by Legal Affairs, 2012

Reviewed and Approved by the COSEP, May 2, 2012

Final Document Reviewed by Committee on Admissions, May 9, 2012

The following technical guidelines have been adopted by Rush Medical College Committee on Admissions. A candidate for the MD degree must have abilities and skills in the areas of observation; communication; sensory and motor coordination and function; intellectual-conceptual, integrative, and quantitative abilities; and behavioral and social attributes as described below.

Observation. Students should be able to observe demonstrations and experiments in the basic sciences. Students should be able to observe a patient accurately at a distance and close at hand. Observation necessitates the functional use of vision, auditory, and somatic sensation. It is enhanced by the functional use of the sense of smell.

Communication. Students should be able to speak and hear English and to observe patients in order to elicit information, describe changes in mood, activity, and posture, and perceive nonverbal communications. Students should be able to

communicate effectively and sensitively with patients, their family, health care team members, their peers, faculty and the public. Communication includes not only speech but also reading and writing. Students should be able to communicate effectively and efficiently in oral and written forms of English with all members of the health care team.

Motor. Students should have sufficient motor function to elicit information from patients by palpation, auscultation, percussion, and other diagnostic maneuvers. Students should be able to perform basic laboratory tests, carry out diagnostic and therapeutic procedures, and read graphic images. Students should be able to execute motor movements required to provide general care to patients, and to either provide or direct the provision of emergency treatment of patients. Such actions require coordination of both gross and fine muscular movements, and functional use of the senses of touch and vision.

Intellectual, Conceptual, Integrative, and Quantitative Abilities. Students should be able to engage in problem solving, the critical skill demanded of physicians, which requires the intellectual abilities of measurement, retrieval, calculation, reasoning, analysis, and synthesis. In addition, students should be able to comprehend three-dimensional relationships and to understand the spatial relationships of structures and to adapt to different learning environments.

Behavioral and Social Attributes. Students should possess the emotional health required for full utilization of their intellectual abilities, the exercise of good judgment, the prompt completion of all responsibilities attendant to the diagnosis and care of patients, and the development of mature, sensitive, and effective relationships with patients, fellow students, faculty, and staff. Students should be able to tolerate physically taxing workloads and to function effectively under stress. They should be able to adapt to changing environments, to display flexibility, and to learn to function in the face of uncertainties inherent in the clinical problems of many patients. Compassion, integrity, concern for others, interpersonal skills, interest, and motivation are all personal qualities that are assessed during the admissions and education processes.

Ethics and Professionalism. Students should maintain and display ethical and moral behaviors commensurate with the role of a physician in all interactions with patients, faculty, staff, students, and the public. Students should understand the legal and ethical aspects of medical practice and strive to abide by these principles throughout their time in training.

Requests for accommodation by individuals with a disability as defined by the Rehabilitation Act of 1973 or the Americans with Disability Act will be considered on the basis of their abilities and the extent to which reasonable accommodation, if required, can be provided. The Rush University Policy for Students with Disabilities describes the process for requesting an accommodation and is available on the University's website.

Graduation Requirements

The following are prerequisites to the granting of the degree of Doctor of Medicine (MD) by Rush University for students graduating in 2016. Each student's progress in each year of the Rush Medical College curriculum will be evaluated by the Committee on Student Evaluation and Promotion (COSEP).

- Successful completion of the first and second year curricula in accordance with the Committee on Student Evaluation and Promotion (COSEP) Policies and Procedures.
- Pass United States Medical Licensing Examination (USMLE) Step 1 per the dates set by the Office of Medical Student Programs (OMSP) guidelines.
- Pass USMLE Step 2 Clinical Knowledge (CK) and Clinical Skills (CS) per the dates set by the OMSP guidelines.
- Attend and complete the Clinical Resources and Skills for the Hospital (CRASH) course prior to beginning the third year.
- Pass all required third year core clerkships.
- Pass all required fourth year core clerkships.
- Pass a required fourth year sub-internship.
- Successfully complete the Transition to Residency course (taught over two semesters).
- Be scheduled for completion of all elective clerkship requirements by the beginning of the second semester of the student's fourth year in order to graduate in the next calendar year.
- Successfully complete the Clinical Skills Assessment.
- Successfully complete the Capstone Project.
- Successfully complete the Rush Medical College Service Learning requirement.
- Successfully complete all additional weeks of instruction required by the COSEP depending upon the progress made by the student.
- Attain the level of achievement required by the faculty for the degree of MD within 60 months from matriculation.

Graduation Requirements and the National Resident Matching Program (NRMP)

The OMSP will immediately notify future residency program directors when a student who has matched will not complete graduation requirements by the graduation date. If the inability to graduate is determined prior to the match, the student and the OMSP must immediately notify the National Resident Matching Program that the student is withdrawing from the match. The student must notify all of the programs to which the student applied that the student is withdrawing from the match.

Rush Medical College: Academic Program

Curriculum: First and Second Years

Curriculum: First Year

The first year basic science content is integrated into seven blocks taught in sequence through the academic year.

Cell and Molecular Biology	RMD-510
Immunology and Hematology	RMD-511
Musculoskeletal System	RMD-512
Cardiovascular and Pulmonary Systems	RMD-513
Gastrointestinal System and Metabolism	RMD-514
Genitourinary Systems	RMD-515
Central Nervous System / Head and Neck	RMD-516
Blocks are aligned with the Physicianship program:	
Physicianship Program I	RMD-531
Physicianship Program II	RMD-532
At the start of the first year, students begin a three-year self-directed program:	
Capstone I	RMD-517
Capstone II	RMD-518

Elective courses may be taken in parallel with the required first year curriculum. Four first year electives are offered: Humanities in Medicine, Basic Biomedical Research, Sonographic Anatomy, and Medical Spanish. Due to limited enrollment for these courses, registration is determined through a lottery.

Curriculum: Second Year

The second year basic science content is integrated into blocks taught in sequence through the academic year that focus on the study of the causes and effects of disease and therapeutics. Second year students also complete two courses in Evidence-Based Medicine which focus on epidemiology, biostatistics and the evidence-based practice of medicine. The Physicianship and Capstone Programs continue in the second year to complement the courses listed.

Mechanisms of Disease	RMD-523
Diseases of the Cardiovascular and Respiratory Systems	RMD-524
Diseases of the Central Nervous System	RMD-526
Diseases of the Genitourinary Systems	RMD-525
Gastrointestinal, Liver and Metabolic Diseases	RMD-527
Hematology, Dermatology and Musculoskeletal Disease	RMD-528
Evidence-Based Medicine	RMD-529A
Evidence-Based Medicine	RMD-529B
Physicianship III	RMD-533
Physicianship IV	RMD-534
Capstone III	RMD-519
Capstone IV	RMD-520

Grading - First and Second Years

Students in the first and second years will receive a grade of honors, pass, fail or incomplete for each of the blocks. The Physicianship and Capstone Programs are graded pass/fail.

USMLE Step 1

Prior to the start of the third year, students must take the United States Medical Licensing Examination (USMLE) Step 1. Students who do not pass USMLE Step 1 are required to discontinue the third year curriculum for remediation (please refer to section on USMLE Step 1 failure for additional information).

Curriculum: Third and Fourth Years

The curricula of the third and fourth years provide students with additional training in clinical skills, diagnosis and patient management in a variety of patient care settings.

Prior to the start of the third year, students participate in the Clinical Resources and Skills for the Hospital (CRASH) course, which is an intensive review of clinical skills.

Clinical experiences primarily take place at Rush University Medical Center and the John H. Stroger, Jr. Hospital of Cook County. Students request a schedule of the third year required clerkships and electives through a lottery toward the end of the second year and request a schedule of the fourth year required clerkship, sub-internship, and electives through a lottery toward the end of the third year.

A minimum of 78 weeks of clinical experiences is required for graduation. The curriculum includes 52 weeks of required core clerkships in internal medicine, neurology, pediatrics, psychiatry, obstetrics/gynecology, surgery, emergency medicine, and primary care; a required senior sub-internship; and the year-long Transition to Residency course. The remaining 26 weeks required for graduation consist of elective study in areas of special interest to each student. The choice of electives is guided by the goal of an educationally balanced undergraduate experience. Of the 26 weeks of required student-chosen electives, up to 12 weeks of elective study may take place at other Liaison Committee on Medical Education (LCME)- or Accreditation Council for Graduate Medical Education (ACGME)-accredited institutions and a maximum of eight weeks of elective rotations may be taken in a single subspecialty.

Grading - Third and Fourth Years

In the third and fourth years, students will receive a grade of honors, high pass, pass, fail or incomplete for each of the clerkships and electives.

Clinical Skills Assessment

In preparation for the USMLE Step 2 Clinical Skills exam, fourth-year students complete the Clinical Skills Assessment (CSA) with standardized patients at the start of the fourth year. This experience is designed to aid in self-evaluation of one's clinical skills (communication and interpersonal skills, attitudes and procedural skills). Successful completion of the CSA is a graduation requirement.

Academic Policies

Definition of Student Status

The status of a student shall be determined in accordance with the Committee on Student Evaluation and Promotion (COSEP) Policies and Procedures.

Full-time Student. Any student enrolled in Rush Medical College, paying tuition or appropriate fees and scheduled to take courses leading to the MD degree, is a full-time student. Rush Medical College does not have a part-time student option available for students.

Leave of Absence. A student who, for a predetermined period of time, is not paying tuition and not actively enrolled at Rush Medical College will be on a Leave of Absence (LOA).

Dismissal. Dismissal is the permanent administrative termination of a student.

Withdrawal. Withdrawal is the voluntary termination of enrollment by a student.

1. A student who withdraws from the college and subsequently seeks reinstatement must submit a written petition for reinstatement to the Committee on Admissions of the college if withdrawal took place before the completion of the student's first term of enrollment. If the student withdrew subsequent to the first term, the student must submit a written petition to the COSEP for reinstatement.
2. A student who fails to engage in registration for courses or who fails to engage in a course according to the policies of the college will be considered to have withdrawn. A student withdrawing under this provision may submit a written petition to the Office of Medical Student Programs (OMSP) for reinstatement. The OMSP shall determine whether special circumstances existed which justified the student's failure to engage or whether the student's petition should be forwarded to the COSEP.

Please see the COSEP Policies and Procedures for full details about student status.

Course Credit

Rush Medical College assigns no credit hour value to its courses. First- and second-year courses are recorded on the transcript according to the semester in which the courses are given; clinical courses/clerkships are recorded on the transcript according to the dates when the course is taken.

Grades and Examinations

The grading system for Rush Medical College shall be established by the COSEP and adhered to by course directors. Please see the COSEP Policies and Procedures for details about course grading.

Recording and Notification of Grades

Please see the COSEP Policies and Procedures for details about notification about grades.

Student Performance Assessment in a Course

Please see the COSEP Policies and Procedures for details on the following:

- Performance evaluation
- Absences from examinations
- Failed courses
- Status of students with course failures

Academic Dismissal

Grounds for dismissal are outlined in the COSEP policies and procedures.

Remedial Programs

Failure in First or Second Year Curriculum

The Committee on Student Evaluation and Promotion (COSEP) establishes requirements for remedial work for students with more than one outstanding course failures in the first or second year. Remedial work requirements will be reasonably related to the seriousness of the student's deficiencies. Such requirements may include but need not be limited to the following: study with re-examination, retaking failed courses during the next academic year and retaking all courses including those satisfactorily passed.

Failure in Third or Fourth Year Curriculum

A failure in a required clerkship must be remediated in a manner prescribed by the course director in consultation with the Office of Medical Student Programs (OMSP), and approved by the COSEP, and consistent with the reasons for the student's failure. A student required to repeat any component(s) of a required clerkship must complete the failed course prior to beginning another core rotation. In developing requirements, the COSEP will consider the needs of the individual student and will endeavor to develop a program that, if successfully completed, will strengthen the student's prospects for successfully completing the program.

United States Medical Licensure Examinations (USMLE)

USMLE - Step 1

All students must take and pass USMLE Step 1 at the completion of the second year curriculum. Permission to defer taking this examination must be granted by the OMSP. Students who defer Step 1 beyond the established deadline must take the exam within nine months of completing the second year, and defer clinical rotations until a passing score is achieved. Students who fail the USMLE Step 1 are removed from clinical rotations and placed on a LOA until a passing score is achieved. Students who fail the USMLE Step 1 three times are recommended to the COSEP for dismissal.

USMLE - Step 2

All students must take and pass both the Clinical Knowledge (CK) and Clinical Skills (CS) components of USMLE Step 2 during the student's fourth year by a date determined by the OMSP. Failures on either component are reported to the COSEP. Students who fail either component of the USMLE Step 2 three times are recommended to the COSEP for dismissal.

Advisor Program

Incoming Rush Medical College students are assigned to faculty advisors who will provide support and guidance throughout their academic career. Small groups of students work with pairs of advisors, creating an opportunity to develop meaningful longitudinal relationships. Students meet with their advisors regularly, both as groups and individuals. Early on, advisors assist students with all aspects of their transition to medical school. During the second and third years, the focus shifts to guidance regarding career exploration and career choice. In the fourth year, advisors support students in developing a plan for residency specialty choice and preparing for the residency match. Advisors also serve as professional role models and sounding boards, and are available to guide students to medical college resources and support services when needed. New students are also assigned a group of Peer Advisors from the second, third, and fourth years who work with the faculty advisors to provide advice, provide a student perspective about life, ensure student success and enhance student learning.

Student Research Opportunities

Students are encouraged to pursue additional research experience beyond their work on their Capstone projects. Research opportunities range from laboratory experiences in the biomedical sciences to clinical investigation and fieldwork in epidemiology, preventive medicine and primary care. Such research can be carried out during the summer between the first and second years or during the time allotted for elective experiences.

The Dean's Office Summer Research Fellowships are offered on a competitive basis to students between the first and second years to work on research projects with Rush faculty in basic science, clinical research and community service arenas. Students accepted in the program are provided a paid position to work full-time during the summer before the second year on their research project. Many students continue to participate in these projects after the summer.

First-year medical students have the opportunity to enroll in the elective course, Introduction to Biomedical Research. This is a year-long course consisting of lectures, a journal club and one-on-one work with a faculty mentor to develop a research proposal.

Students who are interested in a more in-depth research experience may request a Leave of Absence from the Medical College curriculum to pursue an MS or PhD degree.

Rush Medical College Committees

Committees exist within the structure of Rush Medical College to assure the appropriate involvement of faculty and students in the various activities of the College. Except for the Rush Medical College Student Council, each committee includes representation from both faculty and students.

Faculty Council

This committee is the senior representative body within Rush Medical College. The membership includes professors, associate professors, assistant professors, instructors or assistants and one student from each of the four classes, each chosen by vote of the corresponding constituency.

Committee on Committees

This committee has as its primary responsibility the nomination of individuals to serve on the various standing committees of Rush Medical College. The committee is also responsible for dealing with grievances presented by members of the Rush Medical College community.

Committee on Admissions (CoA)

Members of this committee are responsible for admissions to the Rush Medical College. The duties of the committee members include but are not limited to setting the admissions criteria that will enhance academic excellence, interviewing candidates and selecting the applicants who will be offered acceptance to Rush Medical College.

Committee on Curriculum and Evaluation (CCE)

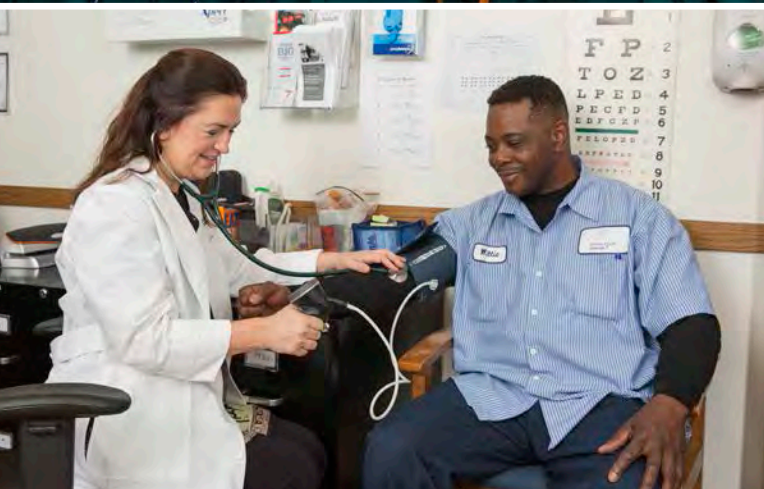
This committee is responsible for the design, content and evaluation of the courses and curriculum. With the assistance of course directors, the committee administers surveys to the students that evaluate course content, delivery and faculty performance.

Committee on Senior Faculty Appointments and Promotions (COSFAP)

The function of this committee is to review recommendations submitted by chairpersons for appointments or promotions of faculty members to academic ranks of indefinite terms in Rush Medical College. Recommendations for appointments or promotions are then submitted to the Office of the Dean for further action.

Committee on Student Evaluation and Promotion (COSEP)

This committee is responsible for developing policies concerning student status, evaluation and promotion; reviewing the academic performance of Rush Medical College students; making recommendations to the Faculty Council and Dean concerning promotion, graduation and dismissal of students; and determining requirements for remedial action for students who have failed medical college courses.



RUSH UNIVERSITY

College of Nursing



Welcome to the College of Nursing

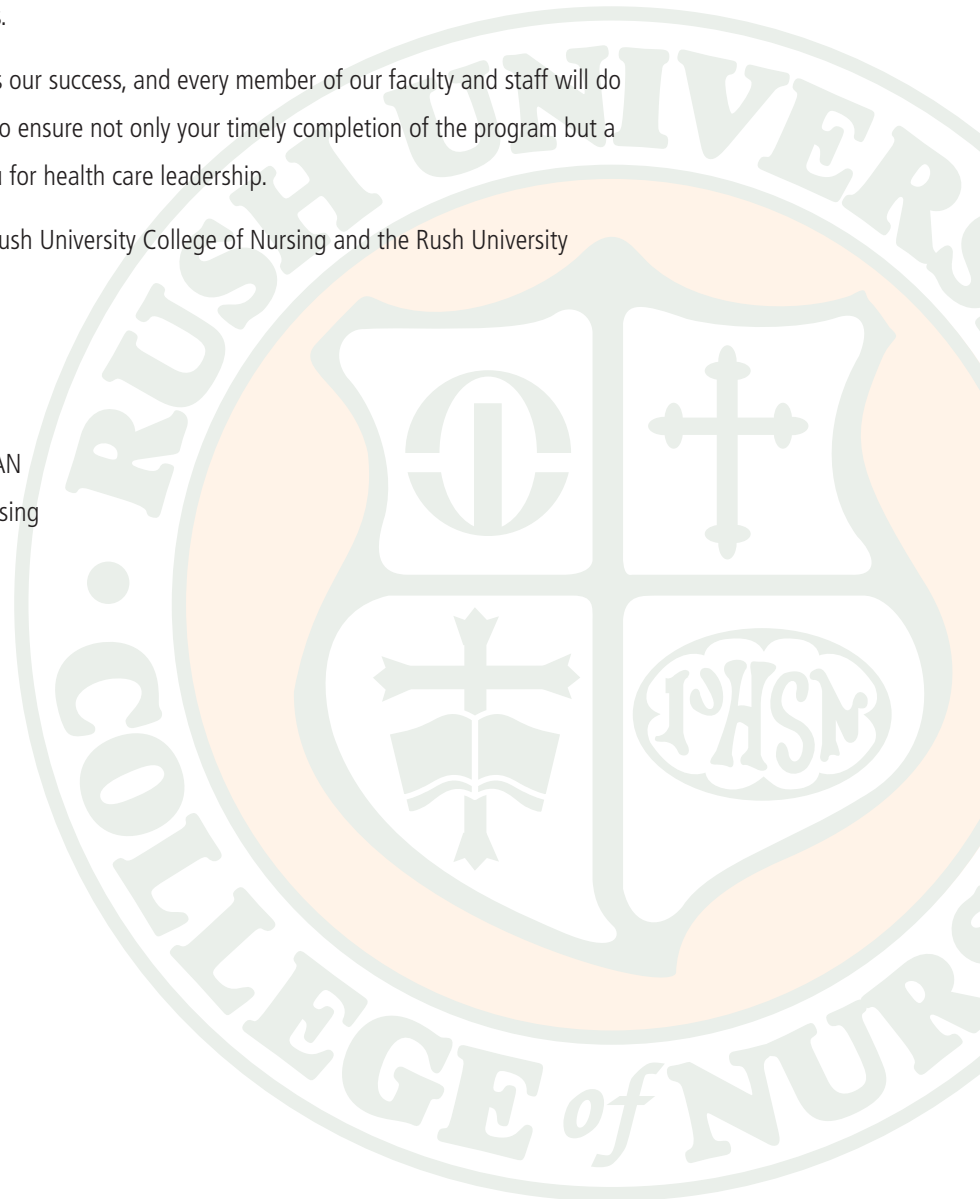


On behalf of the faculty of Rush University College of Nursing, I extend to you our warmest welcome. We are both pleased and honored that you have chosen to further your education at Rush and are committed to having the degree that best prepares you for a rich and fascinating career in nursing and health care. Rush is renowned for its integration of education and practice, and you will have the opportunity to work with extraordinary scholars and clinicians throughout your journey in the College of Nursing. Please know that you can feel comfortable calling on me and any other member of the faculty to meet your personal learning needs.

Your success is our success, and every member of our faculty and staff will do what it takes to ensure not only your timely completion of the program but a quality degree that will groom you for health care leadership.

Again, our warmest welcome to Rush University College of Nursing and the Rush University Medical Center.

Sincerely,
Marquis D. Foreman, PhD, RN, FAAN
Acting Dean of the College of Nursing



College of Nursing Description

Rush University College of Nursing is a private non-profit graduate college of nursing. It currently comprises three degree programs — Master of Science in Nursing (MSN), Doctor of Nursing Practice (DNP), and Doctor of Philosophy in Nursing Science (PhD) — and a post-graduate certificate program. The College of Nursing faculty thoroughly

prepare students to advance the quality of patient care and nursing practice in a multitude of health care environments and to be leaders focused on improving health outcomes, whether at the bedside, in a research setting, or directing an organization.

The education and preparation of students to meet the health needs of a culturally diverse society is facilitated at Rush by the integration of academic, research, and clinical practice components. Rush students have the advantage of attending a private university that is a vital part of a nationally recognized academic medical center. This unique integration stimulates excellence in education, practice, scholarly activities, and professional leadership by the faculty and the graduates of the College of Nursing.

The master's degree in nursing and the Doctor of Nursing Practice programs at Rush University College of Nursing are accredited by the Commission on Collegiate Nursing Education (<http://www.aacn.nche.edu/ccne-accreditation>).

College of Nursing Mission

The mission of Rush University College of Nursing is to protect the health of the public through the preparation of the future leaders in nursing practice, education, and research.

College of Nursing Vision

The vision of the college is to be the academic leader in nursing through innovation and excellence in nursing practice, education, and research.

Philosophy

The College of Nursing philosophy expresses the beliefs of the faculty regarding the meta-paradigm of nursing and nursing education.

Person

The faculty believes that a person is a unique being who possesses innate dignity and worth with the right to self-determination. Persons live as individuals and as members of families, communities, and national and global societies.

Environment

The environment includes the multiple systems in which persons interact. This environment includes personal, physical, family, community, societal, economic, cultural, and political systems. Persons influence and are influenced by their environments.

Health

Health is a dynamic state of well-being that interacts with personal factors and the environment. It is perceived in the context of a multisystem environment.

Nursing

Nursing is both a discipline and a profession. The focus of the discipline is the generation of knowledge related to persons and their environments for the purpose of maximizing the well-being of individuals, families, communities, and society through health promotion, restoration, and maintenance. The focus of the profession is the care of individuals, groups, and communities through application of discipline-specific and discipline-related knowledge. Nurses contribute both individually and collaboratively with other professionals to promote positive health outcomes. Nurses apply a professional code of ethics and professional guidelines to clinical practice and demonstrate compassion, advocacy, and cultural sensitivity.

Nursing Education

The education of nurses is a process by which the knowledge, skills, values, and culture of nursing are transmitted to the learner. The faculty believes that professional nursing education is accomplished in a university setting and in an environment where nursing education, practice, and research are integrated. Nursing education is built upon knowledge from the sciences, arts, and humanities so students understand and value the human experience and its relationship to health. Nursing faculty members foster student growth by providing learning experiences in a variety of health care settings so students can understand the complexity of health care and learn the nursing role. The education of nurses is an interactive process whereby students are actively engaged learners who take responsibility for their education and practice. The curricula of

the College of Nursing are designed to produce nurses who are: 1) competent, caring practitioners; life-long learners that value scholarship; collaborative members of interprofessional teams; and leaders in the profession; and 2) clinical scholars who contribute to the scientific basis of nursing practice, improve clinical outcomes through evidence-based practice, and positively influence the profession and the health care system.

Programs

The College of Nursing offers graduate nursing education that allows the student to exit with one of the following degrees:

- Master of Science in Nursing (MSN)
- Doctor of Nursing Practice (DNP)
- Doctor of Philosophy in Nursing Science (PhD)

A set of core courses (or its equivalent) is required for every student. Advanced clinical specialty courses are required as determined by an area of advanced practice concentration. Cognate courses representing coursework from the biological, behavioral, and organizational sciences may also be required by each degree.

Admission Entry Points

Several entry points are available depending on the educational goals and academic background of the applicant.

1. Students with a baccalaureate degree in another field may apply for the Generalist Entry Master's (GEM) program.
2. RNs with a baccalaureate degree in a field other than nursing may apply directly for the Clinical Nurse Leader MSN degree.
3. RNs with a baccalaureate degree with an upper division major in nursing may apply directly for the Clinical Nurse Leader MSN, advanced practice DNP, or PhD degree options.
4. RNs with a master's degree in nursing may apply for all DNP or PhD degree options.
5. RNs who already have an advanced practice graduate degree in nursing (MSN or DNP) who wish to specialize in a different clinical area may apply for a non-degree post-graduate certificate in selected specialty areas.
6. Non-nurses who hold a graduate degree in a health-related field will be considered for admission to the PhD program.

Master of Science in Nursing

Direct Entry Master's (MSN) for Non-Nurses: Generalist Entry Master's (GEM) Clinical Nurse Leader (CNL) Program

The GEM program comprehensively prepares students, in a two-year full-time curriculum, to be a graduate (MSN) registered nurse (RN) clinician with a focus in clinical leadership. Graduates are prepared to function at a high level in in-patient, out-patient, and community settings. The GEM program gives the student a broad overview of all of the major specialties in which nurses work, as well as a variety of settings across the health care continuum. In the GEM program students take core graduate courses that are applicable in their progression to doctoral education in either a Doctor of Nursing Practice (DNP) specialty or the Doctor of Philosophy in Nursing Science (PhD) program.

Students are considered for admission to the GEM program after completing baccalaureate education at another accredited college or university. The GEM curriculum consists of 74 trimester hours of graduate coursework in nursing and related sciences. Students are eligible to take the National Council Licensure Examination (NCLEX) for RN licensure and Clinical Nurse Leader certification examination upon graduation. GEM students are expected to complete the MSN requirements on a full-time basis in six terms.

Required Prerequisite Courses

As a profession and a discipline, nursing promotes and protects human health and well-being and is grounded in a strong liberal arts, undergraduate education that includes the arts and humanities, as well as the behavioral, social, and physical sciences. Recognizing that different undergraduate majors have varying requirements, applicants will be evaluated both on their success in meeting the requirements of their undergraduate programs and on the breadth and depth of their educational preparation for entry into nursing.

Nursing practice and scholarship have great application in our society, ranging from the acute care of individuals to the management and promotion of the health of whole communities and even nations. The College of Nursing welcomes and is enriched by applicants from a spectrum of disciplines and professions.

*Physical and biological sciences**

This category of requirements includes successful completion of specific physical and biological courses. The following courses are required, minimally, to meet this criterion:

- Anatomy** (laboratory component strongly recommended)

- Physiology** (laboratory component strongly recommended)
- Microbiology with a laboratory component**
- Chemistry with a laboratory component***

**Anatomy and physiology may be taken as two separate courses or as Anatomy and Physiology I and Anatomy and Physiology II.

***General chemistry, inorganic, organic or biochemistry courses with a lab are all acceptable to meet the chemistry requirement.

It is strongly discouraged to take anatomy and physiology online.

Behavioral and social sciences:*

These entry requirements may be met in several ways. They can include, but are not limited to, **at least one course in the behavioral sciences** (e.g., introductory, developmental, abnormal, cognitive or experimental psychology, personality development, women's studies, criminology, gender studies, human sexuality); and **at least one course in the social sciences** (e.g., sociology, anthropology, economics, political science, journalism, geography, African-American studies).

The humanities:*

Applicants should have **at least one course in the humanities**, which may include, for example, courses in the representational and performing arts as well as history, literature, philosophy, art history, communication studies, cultural and classic courses, theater, music theory, dance, cinema, religion, etc.

***It is assumed that if you have completed the general education requirements for a baccalaureate degree, you will have fulfilled the entry requirements for the behavioral and social sciences and humanities. The required prerequisite courses may be taken at any accredited university or community college.**

All required prerequisite courses must be completed, with a grade of "C" or better, prior to the application deadline for which the student is applying. Science courses should be taken with a laboratory component whenever possible. It is highly recommended to have taken human anatomy and physiology within the last three years.

MSN for RNs: Clinical Nurse Leader (CNL)

The master's-prepared clinical nurse leader (CNL) is responsible for clinical management of comprehensive client care, for individuals and clinical populations across the continuum of care, and in multiple settings. The CNL assumes leadership/accountability for health outcomes for a specific group of clients within

a unit or setting through the assimilation and application of research-based information to design, implement, and evaluate plans of care. The clinical nurse leader is also responsible for the coordination and planning of care team activities and functions. Health promotion, risk reduction, and improvement in point-of-care outcomes are critical elements in the role of the clinical nurse leader.

RN applicants to the post-licensure Clinical Nurse Leader (CNL) program must have earned a baccalaureate degree from an accredited university. The program is six terms in length and offered as a part-time program of study. The majority of the CNL program is offered online, but students are required to come to campus for NSG 625L: Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab. This is a live, on-campus compressed (3-4 day) format course. There is a clinical residency requirement that may be completed at the student's place of employment.

All MSN students are expected to complete their degree requirements in no more than five years.

Terminal Objectives

Both the pre-licensure and post-licensure MSN programs comprehensively prepare students to be graduate nurse clinicians with a focus in clinical leadership.

To achieve quality patient (client/population/cohort of clients) outcomes, the Clinical Nurse Leader will:

- Deliver holistic, competent, and contextually appropriate patient/family/population-centered nursing care.
- Synthesize scientific evidence and innovative technologies to guide nursing practice in dynamic care environments.
- Develop collaborative, interdisciplinary, and multi-sector relationships to ensure improved health care.
- Demonstrate leadership behaviors within and across systems at all levels of prevention.
- Manage the structure and processes of the care environment, incorporating policy, fiscal, and macro-system concepts.
- Demonstrate professional values in nursing practice.
- Employ therapeutic use of self and intentional presence to protect the value of the human relationship.

Graduation Requirements

Direct Entry Master's (MSN) for Non-Nurses: Generalist Entry Master's (GEM) Clinical Nurse Leader (CNL) Program requires a minimum of 74 trimester hours of didactic and 1,240 clock hours of clinical instruction. Candidates are given a comprehensive examination in the final term of the program in preparation for the National Council Licensure

Examination for Registered Nurses (NCLEX). Graduates are eligible to sit for the NCLEX and the CNL certification exam.

MSN for RNs: Clinical Nurse Leader (CNL) requires a minimum of 37 credit hours and 400 clock hours of clinical instruction. Graduates are eligible to sit for CNL certification.

Doctor of Nursing Practice (DNP)

Students are considered for admission to the DNP program with one of the following areas of focus:

Doctor of Nursing Practice with Clinical Specialty Certification

Students enter the DNP program with a specific clinical specialty focus after completing a BSN or MSN degree. Students select an area of specialization in one of the following roles and populations:

- Nurse Practitioner:
 - Adult-Gerontology Acute Care (AGACNP)
 - Adult-Gerontology Primary Care (AGPCNP)
 - Family (FNP)
 - Neonatal (NNP)
 - Pediatric Primary Care (PNP)
 - Pediatric Acute Care (ACPNP)
 - Psychiatric-Mental Health (PMHNP)
- Clinical Nurse Specialist:
 - Adult-Gerontology Primary Care (AGCNS)
 - Adult-Gerontology Acute Care (AGACCNS)
 - Neonatal (NCNS)
 - Pediatric (PCNS)
- Advanced Public Health Nursing (APHN)
- Nurse Anesthesia (CRNA)

Some areas of concentration have RN practice requirements that must be met prior to enrollment in the program. These program-specific requirements are delineated below under Program-Specific Requirements.

All specialty areas provide the requisite didactic and clinical coursework in order to sit for certification. Course requirements vary in each area of concentration. The college reserves the right to modify course requirements in consideration of overall curricular goals and design and certification standards.

Depending upon the area of specialization, most BSN-DNP options range between 62 and 69 credit hours. MSN-DNP options require a minimum 30 credit hours of coursework.

Doctor of Nursing Practice: Systems Leadership

This area of focus is a post-master's practice doctorate that prepares graduates for systems-level leadership and improving outcomes in a variety of settings. Students considered for admission should have leadership experience.

Doctor of Nursing Practice: Leadership to Enhance Population Health Outcomes

This area of focus is on the development of population-based knowledge and skills to enhance clinical health outcomes for patient aggregates, communities, and populations. Students with a MSN will be considered for admission to the Leadership to Enhance Population Health Outcomes option.

Terminal Objectives

The DNP degree is designed to prepare graduates to function as highly developed clinicians/leaders in advanced nursing practice or systems of care. Graduates will be prepared to practice in a variety of complex clinical, organizational, and/or educational systems with diverse populations and will be able to affect changes in health care outcomes through evidence-based decision making and system redesign.

- Integrate science-based theories and data-based concepts to develop, critically appraise and implement practice approaches that improve health care and health care systems.
- Apply organizational theories and systems thinking to improve the quality, cost-effectiveness and safety outcomes of practice decisions and initiatives.
- Apply effective strategies for managing the ethical dilemmas inherent in patient care, the health care organization and research.
- Apply knowledge of informatics to monitor and improve outcomes, programs and systems of care.
- Provide leadership in influencing policies on the financing, regulation and delivery of health care.
- Lead interprofessional teams to improve patient and population health outcomes.
- Function independently in an advanced nursing role to improve health outcomes in a specialty area of practice.

Graduation Requirements

The DNP degree requires a minimum of 62 trimester hours of post-baccalaureate or 30 trimester hours of post-master's study. All Doctor of Nursing Practice students must complete degree requirements within five years.

PhD in Nursing Science

Students may enter the PhD program with a BSN or a MSN degree. Non-nurses with a graduate degree in a health-related field may also apply for admission to the PhD program.

Terminal Objectives

Graduates of the PhD program develop the skills of a clinical researcher. These skills are based on the integration of knowledge from biological, behavioral, and clinical sciences. Their clinical research skills contribute to the scientific basis of care provided to individuals across the life span and in any setting where care is provided. Graduates also have leadership skills necessary to serve as senior academicians and influence health care systems and policy.

- Synthesize and apply theoretical and research-based knowledge in the investigation of clinical phenomena
- Test and integrate disciplinary knowledge in models of clinical practice across the levels of prevention
- Generate and disseminate research-based, clinical knowledge
- Analyze health care trends to influence health and social policy for diverse client populations
- Participate in collaborative interprofessional practice and research
- Assume faculty responsibilities within a senior academic environment
- Function as a clinical scientist

Graduation Requirements

Divisional graduation requirements require completion of the approved individual program of study. For MSN to PhD students, coursework for the PhD must be the equivalent of at least 52 trimester hours of graduate credit in addition to the completed dissertation. BSN to PhD students must complete at least 60 trimester hours of graduate credit in addition to the dissertation. Students have a maximum of eight years to complete degree requirements.

Please see the Graduate College section of the catalog for program curriculum information.

Post-Graduate Non-Degree Certificate

The Post-Graduate Non-Degree Certificate is intended for nurses who already have an advanced practice graduate degree in nursing (MSN or DNP) who wish to specialize in a different

clinical area. In addition to the graduate core courses it is expected that the following courses or their equivalent are completed prior to admission to the post-graduate certificate program: Advanced Health Assessment Across the Lifespan, Physiology and/or Pathophysiology, Advanced Pharmacology, APRN Role and Diagnostics for the APRN. Review of these courses for equivalence and transfer credit will be done upon admission into the program.

Post-Graduate Advanced Practice Certificate Options:

- Neonatal
- Pediatric Acute Care

College Admission Requirements

All applicants applying to Rush University College of Nursing do so through a centralized application system, NursingCAS. Application materials (essay, references, transcripts, etc.) are submitted directly to NursingCAS. Official GRE and TOEFL scores, if required, are submitted to University Enrollment Services prior to the application deadline. Applicants will be invited to submit a supplemental application directly to the college upon receipt of their NursingCAS application.

Admission/Application Requirements

All applicants will be evaluated on the following:

- A minimum of a bachelor's degree from an accredited institution*
- All calculated GPAs of 3.0 or higher (on a 4.0 scale)**
- A completed application submitted to NursingCAS
- A brief Rush supplemental application
- Official transcripts from all accredited institutions of higher education attended, regardless of whether a degree was earned
- A current resume or CV
- Substantive personal essay statement
- RN licensure in the United States (for advanced practice post-licensure programs)
- Three letters of recommendation from faculty and/or work managers (for post-licensure applicants at least one letter must come from current or recent employer). Relationship of recommenders to you must be in a supervisory capacity. Recommendations from friends, relatives, or co-workers will not be accepted and will cause your application to be delayed or denied.

- GRE (Graduate Record Examination) Scores, if required
 - The GRE is required for all applicants to the Nurse Anesthesia and PhD programs and cannot be waived.
 - The GRE can be waived for other programs under the following conditions*:
 1. For the Direct Entry Master's: Generalist Entry Master's (GEM), a cumulative GPA of 3.25 or higher.
 2. For the MSN and DNP post-licensure programs, a cumulative GPA of 3.25 or higher; a pre-licensure nursing GPA of 3.0 or higher; a graduate GPA (of a completed degree) of 3.5 or higher.
 - Post-graduate certificate students are not required to take the GRE.
- TOEFL (Test of English as a Foreign Language) scores, if required
 - TOEFL is required for applicants who are non-native speakers of English. This requirement may be waived if the applicant has completed a minimum of three years of higher education and received a baccalaureate degree in the United States.
- All foreign institutions attended require course-by-course ECE, WES, or CGFNS transcript evaluation.

*Eligible applicants to the CNL program include Associate Degree in Nursing (ADN) graduates who have a bachelor's degree in another area.

**Cumulative GPA calculated for all applicants; prerequisite science GPA for GEM applicants only; pre-licensure nursing GPA for all graduate programs except GEM.

Program-Specific Requirements

Direct Entry Master's (MSN) for Non-Nurses: Generalist Entry Master's (GEM) Clinical Nurse Leader (CNL)

All prerequisite courses must be completed by the application deadline.

Advanced Practice applicants must have the following experience by the application deadline:

- **Adult-Gerontology Acute Care** - minimum of six months of recent adult critical care or adult acute care nursing experience
- **Adult-Gerontology Primary Care** - minimum of six months of recent nursing experience
- **Family** - minimum of six months of recent nursing experience
- **Neonatal** - minimum of six months of recent in-patient neonatal nursing experience
- **Nurse Anesthesia** - minimum of one year (two years preferred) of recent adult critical care nursing experience
- **Pediatric Acute Care** - minimum of six months of recent in-patient pediatric nursing experience
- **Pediatric Primary Care** - minimum of six months of recent pediatric nursing experience
- **Psychiatric-Mental Health** - minimum of six months of recent nursing experience

All materials of the application are taken into consideration when evaluating an applicant.

Applicants must have earned a baccalaureate degree with a recognized upper-division major upon enrollment. The majority of credit toward the degree should be earned through university-level coursework. Students taking courses under student-at-large status will not be admitted if their Rush GPA is below 3.0.

Deadlines for Application

Current application deadlines for nursing programs may be obtained on the College of Nursing Program and Admission web page. All application materials must be received by the indicated deadline. Applicants are encouraged to apply early in order to avoid missing deadlines due to a lack of required documentation.

International Students

Students from other countries are welcome to apply. Limited financial aid is available. TOEFL is required for applicants who are non-native speakers of English. This requirement may be waived if the applicant has completed a minimum of three years of higher education and received a baccalaureate degree in the United States.

Student Progression in the College of Nursing

Student progress in the College of Nursing is reviewed and evaluated in several ways. The progressions policies established by the faculty are interpreted and applied by the student's academic advisor, the Office of Academic Affairs, and the College of Nursing Progressions Committee. The faculty reserves the right to request the withdrawal of any student whose conduct, physical or mental health, or performance demonstrates lack of fitness for continuance in a health profession. Should a student's behavior come into

question, policies and procedures to determine the student's continuing status in the college are delineated in the College of Nursing Student Handbook.

Since much of the work in nursing assumes that students will achieve a progressively higher level of understanding and skill, high academic performance is expected. The individual student is responsible for acquiring knowledge inside and outside of formal classroom and clinical settings.

Academic Progressions Policy

A student must achieve an "A" or "B" grade in all required clinical nursing courses. If a "C" grade is achieved in a single clinical seminar course or a single clinical practicum, the student must repeat the course prior to graduation. A student may repeat only one clinical seminar or clinical practicum in a program of study. A grade of "F," "N," "WF" or "WN" or a second "C" in a required clinical seminar or clinical practicum may result in dismissal from the program. An "F," "N," "WF" or "WN" grade in any required course places the student on academic probation and may result in dismissal from the program. Permission may be given to retake a course at the discretion of the Progressions Committee. If permitted, a student has only one opportunity to achieve a passing grade. An "F," "N," "WF" or "WN" grade in the repeated courses may result in dismissal.

Students in all graduate programs must maintain a cumulative 3.0 average in graduate coursework to remain in good academic standing. If a student's cumulative GPA drops below 3.0, the student will be placed on academic probation. A student may enroll for no more than two consecutive terms as a probationary student. Students may be dismissed from the college upon failing to achieve satisfactory academic standing in the required period of time or if the student incurs a second probationary event.

To be awarded a degree or certificate, a student must be in good academic standing at the completion of the program.

College of Nursing Committees

Faculty Senate

The Faculty Senate is the senior representative and governing body for the College of Nursing faculty and operates as the Committee on Committees. The Senate has eight elected members: six faculty members and two student representatives. Members of this body serve three-year terms.

Standing Committees

The Standing Committees of the College of Nursing assist with the work of the college. The faculty elects members of the committees every June, to serve three-year terms. Students are also elected to represent the student body on various committees. The committees include the following:

Admissions and Progressions

The Admissions and Progressions Committee is responsible for the review of all applicants to the College of Nursing and maintaining the admission standards and policies for all nursing programs. This joint committee is also charged with oversight of the progression standards and policies for all nursing programs, and for the progress and performance review of all students.

Curriculum

There is a curriculum committee for each of the College of Nursing programs: MSN, DNP, and PhD. These committees are charged with overseeing the quality and integrity of their respective curricula. The committees review all new courses and/or major changes in the curriculum, establish and monitor methodology for curriculum evaluation, and provide overall consistency for curriculum development.

Diversity and Inclusion

The Diversity and Inclusion Committee provides a forum for communication across all the faculty standing committees to ensure that diversity and inclusion goals of individual committees are supported and strategies are coordinated and aligned to meet the University and College of Nursing strategic plans' diversity and inclusion goals.

Evaluation

This committee evaluates the integrity and quality of the academic enterprise in the College of Nursing using the College of Nursing Evaluation Matrix; ensures the College of Nursing programs are future-oriented and innovative in their approach and align with College of Nursing and University strategic plans; and promotes communication across the three curriculum committees by meeting at least once per term with the three committee chairs to discuss curriculum quality issues and processes.

Faculty Appointments and Promotions

This committee acts upon the appointments and promotions of faculty in accordance with the Rules for Governance.

Faculty Development

The Faculty Development Committee performs a periodic needs assessment and establishes, implements, and evaluates faculty orientation, mentoring, and development programs in collaboration with the college and the University.

Research

This committee establishes, implements, and evaluates criteria for distribution of funds allocated for faculty and student research activities in collaboration with the Office of Research and Scholarship with emphasis on underserved populations. Committee members also collaborate with the Dean and the Associate Dean for Research regarding matters pertaining to research enrichment and suggest measures for ongoing facilitation of research productivity for faculty and students.

Academic Program Curricula

Master's of Nursing Science (MSN)

Area of Focus: Generalist Entry Master's (GEM)

Term 1			Credit Hours
NSG	500	Socialization into Nursing Seminar	1
NSG	501	Role of the Professional Nurse	3
NSG	501P	Role of the Professional Nurse Practicum	3
NSG	510	Pathophysiology: Advanced Generalist	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
			Subtotal 13
Term 2			Credit Hours
NSG	502	Nursing Management of Common Health Alterations Across the Lifespan	3
NSG	502P	Nursing Management of Common Health Alterations Across the Lifespan Practicum	3
NSG	511	Pharmacology: Advanced Generalist	3
NSG	525	Health Assessment Across the Lifespan	2
NSG	525L	Health Assessment Across the Lifespan Lab: Advanced Generalist	1
			Subtotal 12
Term 3			Credit Hours
NSG	503	Psychiatric and Mental Health Nursing	3
NSG	503P	Psychiatric and Mental Health Nursing Practicum	3
NSG	524	Health Promotion in Individual and Clinical Populations	3
NSG	523	Research for Evidence-Based Practice	3
			Subtotal 12
Term 4*			Credit Hours
NSG	504	Women's Health and Newborns	3
NSG	505	Public Health Nursing	3
NSG	504P	Women's Health Nursing Practicum	1
NSG	505P	Public Health Nursing Practicum	2
Elective			3
			Subtotal 12
Term 5*			Credit Hours
NSG	506	Nursing Management of Complex Health Alterations Across the Lifespan	3
NSG	506P	Nursing Management of Complex Health Alterations Across the Lifespan Practicum	3
NSG	521	Organizational and Systems Leadership	3
NSG	512	Clinical Leadership	3
			Subtotal 12
Term 6*			Credit Hours
NSG	513	Capstone Seminar: Clinical Leader (pre-licensure)	3
IDS	505	Interdisciplinary Studies in Palliative Care	2
NSG	514	Immersion: Clinical Leader (pre-licensure)	7
NSG	507	Comprehensive Exam	1
			Subtotal 13
			Total 74

* Students must complete a minimum of 132 non-supervised hours in order to meet the CNL competencies. Students may register for NSG GEM: Opportunities for GEM in terms 4, 5, and 6 in order to access a list of current sites. This is a 0-credit course.

Master of Science in Nursing (MSN)

Area of Focus: Clinical Nurse Leader (CNL)-Part Time

Term 1			Credit Hours
NSG	532	Advanced Physiology	3
NSG	602	Health Economics, Policy and Finance	3
			Subtotal 6
Term 2			Credit Hours
NSG	533	Advanced Pathophysiology	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
NSG	625L*	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
			Subtotal 6
Term 3			Credit Hours
NSG	531	Advanced Pharmacology	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
			Subtotal 6
Term 4			Credit Hours
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals and Clinical Populations	3
			Subtotal 6
Term 5			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	512	Clinical Leadership	3
			Subtotal 6
Term 6			Credit Hours
NSG	513A	Capstone Seminar: Clinical Leader (post-licensure)	1
NSG	515	Clinical Immersion and Capstone: Clinical Nurse Leader (post-licensure)	6
			Subtotal 7
			Total 37

* This is a live, on-campus compressed (3-4 day) format course. Please contact course faculty for exact dates.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Adult-Gerontology Acute Care Nurse Practitioner (AGACNP)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in the Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	572	Quality and Safety for the Aging Adult	3
NSG	570A	Pharmacotherapeutics - Acute Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571C	Management: Adult/Gerontology Acute and Critical Illness I	4
NSG	571D	Management: Adult/Gerontology Acute and Critical Illness II	2
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (420 Clock Hours)	5
NSG	607	DNP Immersion Residency (420 Clock Hours)	5
			Subtotal 12
			Total 69

Doctor of Nursing Practice (MSN to DNP – non-APRN)

Population/Role: Adult-Gerontology Acute Care Nurse Practitioner (AGACNP)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	572	Quality and Safety for the Aging Adult	3
NSG	570A	Pharmacotherapeutics - Acute Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571C	Management: Adult/Gerontology Acute and Critical Illness I	4
NSG	571D	Management: Adult/Gerontology Acute and Critical Illness II	2
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (420 Clock Hours)	5
NSG	607	DNP/Specialty Immersion Residency (420 Clock Hours)	5
			Subtotal 12
			Total 55

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (MSN to DNP – APRN)

Population/Role: Adult-Gerontology Acute Care Nurse Practitioner (AGACNP)

DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	572	Quality and Safety for the Aging Adult	3
NSG	570A	Pharmacotherapeutics - Acute Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571C	Management: Adult/Gerontology Acute and Critical Illness I	4
NSG	571D	Management: Adult/Gerontology Acute and Critical Illness II	2
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (168 Clock Hours)	2
NSG	607	DNP/Specialty Immersion Residency (420 Clock Hours)	5
			Subtotal 9
			Total 36

Additional coursework may be required. A gap analysis will be performed and an individualized program of study developed based on previous graduate education completed with evidence of the following coursework:

- Advanced Health Assessment Across the Lifespan
- Advanced Pathophysiology
- Advanced Pharmacology
- Transition to the APRN Role
- Research
- Biostatistics/Epidemiology

It is expected that previous clinical hours plus DNP/Specialty Practicum and Immersion hours will be equal to or greater than 1000 clock hours.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Adult-Gerontology Primary Care Nurse Practitioner (AGPCNP)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
Subtotal			14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	APRN Role Transition	3
Subtotal			16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
Subtotal			12
Population/Role Cognates			Credit Hours
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	572	Quality and Safety for Aging Adults	3
Subtotal			15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (504 Clock Hours)	6
NSG	607	DNP Immersion Residency (336 Clock Hours)	4
Subtotal			12
Total			69

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Adult-Gerontology Primary Care Nurse Practitioner (AGPCNP)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	572	Quality and Safety for Aging Adults	3
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (504 Clock Hours)	6
NSG	607	DNP/Specialty Immersion Residency (336 Clock Hours)	4
			Subtotal 12
			Total 55

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (MSN to DNP – APRN)

Population/Role: Adult-Gerontology Primary Care Nurse Practitioner (AGPCNP)

DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	572	Quality and Safety for Aging Adults	3
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (504 Clock Hours)	3
NSG	607	DNP/Specialty Immersion Residency (336 Clock Hours)	4
			Subtotal 9
			Total 36

Additional coursework may be required. A gap analysis will be performed and an individualized program of study developed based on previous graduate education completed with evidence of the following coursework: Advanced Health Assessment Across the Lifespan, Advanced Pathophysiology, Advanced Pharmacology, Transition to the APRN Role, Research, and Biostatistics/Epidemiology.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Family Nurse Practitioner (FNP)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 11
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 9
Population/Role Cognates			Credit Hours
NSG	566	Population Assessment and Health Promotion Frameworks	3
NSG	567	Population Intervention Planning, Implementation, and Evaluation	3
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	569	Maternal Child Management for the FNP	3
			Subtotal 21
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (504 Clock Hours)	6
NSG	607	DNP Immersion Residency (336 Clock Hours)	4
			Subtotal 12
			Total 69

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Family Nurse Practitioner (FNP)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 9
Population/Role Cognates			Credit Hours
NSG	566	Population Assessment and Health Promotion Frameworks	3
NSG	567	Population Intervention Planning, Implementation, and Evaluation	3
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	569	Maternal Child Management for the FNP	3
			Subtotal 21
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (504 Clock Hours)	6
NSG	607	DNP/Specialty Immersion Residency (336 Clock Hours)	4
			Subtotal 12
			Total 58

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Neonatal Nurse Practitioner (NNP)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
			Subtotal 12
Advanced Practice Nursing Core			Credit Hours
NSG	533	Advanced Pathophysiology	3
NSG	547	Neonatal Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	548	Advanced Neonatal Physical Assessment	3
NSG	537	Transition to the APRN Role	3
			Subtotal 15
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	549	Neonatal Pharmacotherapeutics	3
NSG	546	Developmental Physiology of the Fetus/Neonates	3
NSG	550A	Neonatal Management I	3
NSG	550B	Neonatal Management II	3
NSG	550C	Neonatal Management III	3
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (588 Clock Hours)	7
NSG	607	DNP Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 66

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Neonatal Nurse Practitioner (NNP)

Advanced Practice Nursing Core			Credit Hours
NSG	533	Advanced Pathophysiology	3
NSG	547	Neonatal Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	548	Advanced Neonatal Physical Assessment	3
NSG	537	Transition to the APRN Role	3
			Subtotal 15
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	549	Neonatal Pharmacotherapeutics	3
NSG	546	Developmental Physiology of the Fetus/Neonates	3
NSG	550A	Neonatal Management I	3
NSG	550B	Neonatal Management II	3
NSG	550C	Neonatal Management III	3
			Subtotal 15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 54

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Pediatric Nurse Practitioner (PNP)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B*	DNP Project Planning II	1
NSG	604C*	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	556	Applied Pharmacology: Pediatric	3
NSG	551A	Advanced Primary Care of the Child I	3
NSG	551B	Advanced Primary Care of the Child II	3
NSG	551C	Advanced Primary Care of the Child III	3
IDS	505	Palliative Care	2
			Subtotal 14
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (588 Clock Hours)	7
NSG	607	DNP Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 68

* Depending on plan of study, students will register for NSG-604B DNP Project Planning II (1 credit hour) and NSG-604C DNP Project Planning III (1 credit hour) or NSG-604D DNP Project Planning II and III (2 credit hours).

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Pediatric Nurse Practitioner (PNP)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B*	DNP Project Planning II	1
NSG	604C*	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	556	Applied Pharmacology: Pediatric	3
NSG	551A	Advanced Primary Care of the Child I	3
NSG	551B	Advanced Primary Care of the Child II	3
NSG	551C	Advanced Primary Care of the Child III	3
IDS	505	Palliative Care	2
			Subtotal 14
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 54

* Depending on plan of study, students will register for NSG-604B DNP Project Planning II (1 credit hour) and NSG-604C DNP Project Planning III (1 credit hour) or NSG-604D DNP Project Planning II and III (2 credit hours).

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Area of Focus: Pediatric Acute Care Nurse Practitioner (AC PNP)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	604A	DNP Project Planning I	1
NSG	604B*	DNP Project Planning II	1
NSG	604C*	DNP Project Planning III	1
			Subtotal 12
Specialty Cognates			Credit Hours
IDS	505	Palliative Care	2
NSG	551A	Advanced Primary Care of the Child I	3
NSG	556	Applied Pharmacology - Pediatric	3
NSG	557A	Pediatric Acute Care I	3
NSG	557B	Pediatric Acute Care II	3
NSG	679	<i>Academic Scholarship in Nursing (recommended)</i>	2-4
			Subtotal 16-18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Primary Care Pediatric Specialty Practicum (84 Clock Hours)	1
NSG	606	DNP/Acute Care Pediatric Specialty Practicum (504 Clock Hours)	6
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 70-72

* Depending on plan of study, students will register for NSG-604B DNP Project Planning II (1 credit hour) and NSG-604C DNP Project Planning III (1 credit hour) or NSG-604D DNP Project Planning II and III (2 credit hours).

Doctor of Nursing Practice (MSN to DNP – non-APRN)

Area of Focus: Pediatric Acute Care Nurse Practitioner (AC PNP)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	604A	DNP Project Planning I	1
NSG	604B*	DNP Project Planning II	1
NSG	604C*	DNP Project Planning III	1
			Subtotal 12
Specialty Cognates			Credit Hours
NSG	556	Applied Pharmacology - Pediatric	3
IDS	505	Palliative Care	2
NSG	551A	Advanced Primary Care of the Child I	3
NSG	557A	Pediatric Acute Care I	3
NSG	557B	Pediatric Acute Care II	3
NSG	679	Academic Scholarship in Nursing (recommended)	2-4
			Subtotal 14-18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Primary Care Pediatric Specialty Practicum (84 Clock hours)	1
NSG	606	DNP/Acute Care Pediatric Specialty Practicum (504 Clock Hours)	6
NSG	607	DNP/Acute Care Pediatric Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 54-58

* Depending on plan of study, students will register for NSG-604B DNP Project Planning II (1 credit hour) and NSG-604C DNP Project Planning III (1 credit hour) or NSG-604D DNP Project Planning II and III (2 credit hours).

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (MSN to DNP – APRN)

Area of Focus: Pediatric Acute Care Nurse Practitioner (AC PNP)

DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Specialty Cognates			Credit Hours
IDS	505	Palliative Care	2
NSG	551A	Advanced Primary Care of the Child I	3
NSG	557A	Pediatric Acute Care I	3
NSG	557B	Pediatric Acute Care II	3
NSG	679	<i>Academic Scholarship in Nursing (recommended)</i>	2-4
			Subtotal 11-15
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/ Primary Care Pediatric Specialty Practicum (84 Clock Hours) (MS/MSN practicum may be transferred in to meet this requirement)	1
NSG	606	DNP/Acute Care Pediatric Specialty Practicum (252 Clock Hours)	3
NSG	607	DNP/Acute Care Pediatric Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 9
			Total 32-36

Additional coursework may be required. A gap analysis will be performed and an individualized program of study developed based on previous graduate education completed with evidence of the following coursework:

- Advanced Health Assessment Across the Lifespan/Diagnostics for the APRN
- Advanced Physiology and Advanced Pathophysiology
- Advanced Pharmacology and Pharmacotherapeutics
- Transition to the APRN Role
- Research
- Biostatistics/Epidemiology

It is expected that previous clinical hours plus DNP/Specialty Practicum and Immersion hours will be equal to or greater than 1000 clock hours.

*Evidence of current APRN certification and active practice within the past two years required.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Psychiatric-Mental Health Nurse Practitioner (PMHNP)

Advanced Practice Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	537	Transition to the APRN Role	3
			Subtotal 10
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	576	Neurophysiology: A Lifespan Approach	3
NSG	575	Psychopharmacology	3
NSG	534	Major Psychopathological Disorders	3
NSG	577A	Diagnostics and Management I: Psychiatric Assessment Across the Lifespan	3
NSG	577B	Diagnostics and Management II: Evidence-Based Treatment	3
NSG	577C	Diagnostics and Management III: Group Therapy and Complex Care	3
			Subtotal 18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (588 Clock Hours)	7
NSG	607	DNP Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 66

Doctor of Nursing Practice (MSN to DNP – non-APRN)

Population/Role: Psychiatric-Mental Health Nurse Practitioner (PMHNP)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	537	Transition to the APRN Role	3
			Subtotal 10
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	576	Neuropathophysiology: A Lifespan Approach	3
NSG	575	Psychopharmacology	3
NSG	534	Major Psychopathological Disorders	3
NSG	577A	Diagnostics and Management I: Psychiatric Assessment Across the Lifespan	3
NSG	577B	Diagnostics and Management II: Evidence-Based Treatment	3
NSG	577C	Diagnostics and Management III: Group Therapy and Complex Care	3
			Subtotal 18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 52

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (MSN to DNP – APRN)

Population/Role: Psychiatric-Mental Health Nurse Practitioner (PMHNP)

DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	576	Neuropathophysiology: A Lifespan Approach	3
NSG	575	Psychopharmacology	3
NSG	534	Major Psychopathological Disorders	3
NSG	577A	Diagnostics and Management I: Psychiatric Assessment Across the Lifespan	3
NSG	577B	Diagnostics and Management II: Evidence-Based Treatment	3
NSG	577C	Diagnostics and Management III: Group Therapy and Complex Care	3
			Subtotal 18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 42

Additional coursework may be required. A gap analysis will be performed and an individualized program of study developed based on previous graduate education completed with evidence of the following coursework:

- Advanced Health Assessment Across the Lifespan
- Advanced Pathophysiology
- Advanced Pharmacology
- Transition to the APRN Role
- Research
- Biostatistics/Epidemiology

It is expected that previous clinical hours plus DNP/Specialty Practicum and Immersion hours will be equal to or greater than 1000 clock hours.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Adult-Gerontology Clinical Nurse Specialist (AGCNS)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	572	Quality and Safety for Aging Adults	3
NSG	679	Academic Scholarship in Nursing Education	1-4
			Subtotal 16-19
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (504 Clock Hours)	6
NSG	607	DNP Immersion Residency (336 Clock Hours)	4
			Subtotal 12
			Total 70-73

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Adult-Gerontology Clinical Nurse Specialist (AGCNS)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	534	Major Psychopathological Disorders	3
NSG	570B	Pharmacotherapeutics - Primary Care	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571B	Management: Adult/Gerontology II	3
NSG	572	Quality and Safety for Aging Adults	3
NSG	679	Academic Scholarship in Nursing Education	1-4
			Subtotal 16-19
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (504 Clock Hours)	6
NSG	607	DNP/Specialty Immersion Residency (336 Clock Hours)	4
			Subtotal 12
			Total 56-59

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Adult-Gerontology Acute Care Clinical Nurse Specialist (AGACCNS)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	570A	Pharmacotherapeutics - Acute Care	3
NSG	572	Quality and Safety for Aging Adults	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571C	Management: Adult/Gerontology Acute and Critical Illness I	4
NSG	571D	Management: Adult/Gerontology Acute and Critical Illness II	2
NSG	679	Academic Scholarship in Nursing	2-4
			Subtotal 17-19
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (588 Clock Hours)	7
NSG	607	DNP Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 71-73

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Adult-Gerontology Acute Care Clinical Nurse Specialist (AGACCNS)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 16
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604D	DNP Project Planning II and III	2
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	570A	Pharmacotherapeutics - Acute Care	3
NSG	572	Quality and Safety for Aging Adults	3
NSG	571A	Management: Adult/Gerontology I	3
NSG	571C	Management: Adult/Gerontology Acute and Critical Illness I	4
NSG	571D	Management: Adult/Gerontology Acute and Critical Illness II	2
NSG	679	Academic Scholarship in Nursing	2-4
			Subtotal 17-19
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 12
			Total 57-59

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Area of Focus: Neonatal Clinical Nurse Specialist (NCNS)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
			Subtotal 12
Advanced Practice Nursing Core			Credit Hours
NSG	533	Advanced Pathophysiology	3
NSG	547	Neonatal Pathophysiology	3
NSG	548	Advanced Neonatal Physical Assessment	3
NSG	531	Advanced Pharmacology	3
NSG	536	Principles of Case Management for Advanced Nursing Practice	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 21
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in the Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Specialty Cognates			Credit Hours
NSG	546	Developmental Physiology of the Fetus/Neonate	3
NSG	549	Neonatal Pharmacotherapeutics	3
IDS	505	Palliative Care	2
NSG	550A	Neonatal Management I	3
NSG	550B	Neonatal Management II	3
NSG	550C	Neonatal Management III	3
NSG	679	Academic Scholarship in Nursing	2-4
			Subtotal 19-21
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (672 Clock Hours)	8
NSG	607	DNP/Specialty Immersion Residency (168 Clock Hours)	2
			Subtotal 12
			Total 76-78

Doctor of Nursing Practice (MSN to DNP)

Area of Focus: Neonatal Clinical Nurse Specialist (NCNS)

Advanced Practice Nursing Core			Credit Hours
NSG	533	Advanced Pathophysiology	3
NSG	547	Neonatal Pathophysiology	3
NSG	548	Advanced Neonatal Physical Assessment	3
NSG	531	Advanced Pharmacology	3
NSG	536	Principles of Case Management for Advanced Nursing Practice	3
NSG	535	Diagnostics for the APRN	3
NSG	537	Transition to the APRN Role	3
			Subtotal 21
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Specialty Cognates			Credit Hours
NSG	546	Developmental Physiology of the Fetus/Neonate	3
NSG	549	Neonatal Pharmacotherapeutics	3
IDS	505	Palliative Care	2
NSG	550A	Neonatal Management I	3
NSG	550B	Neonatal Management II	3
NSG	550C	Neonatal Management III	3
NSG	679	Academic Scholarship in Nursing	2-4
			Subtotal 19-21
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (672 Clock Hours)	8
NSG	607	DNP/Specialty Immersion Residency (168 Clock Hours)	2
			Subtotal 12
			Total 64-66

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Pediatric Clinical Nurse Specialist (PCNS)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	536	Principles of Case Management for Advanced Nursing Practice	3
NSG	537	Transition to the APRN Role	3
			Subtotal 19
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	556	Applied Pharmacology: Pediatric	3
NSG	551A	Advanced Primary Care of the Child I	3
NSG	557A	Pediatrics Acute Care I	3
NSG	557B	Pediatrics Acute Care II	3
IDS	505	Palliative Care	2
NSG	679	Academic Scholarship in Nursing Education	2-4
			Subtotal 16-18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (672 Clock Hours)	8
NSG	607	DNP Immersion Residency (168 Clock Hours)	2
			Subtotal 12
			Total 73-75

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Pediatric Clinical Nurse Specialist (PCNS)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	535	Diagnostics for the APRN	3
NSG	536	Principles of Case Management for Advanced Nursing Practice	3
NSG	537	Transition to the APRN Role	3
			Subtotal 19
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
NSG	556	Applied Pharmacology: Pediatric	3
NSG	551A	Advanced Primary Care of the Child I	3
NSG	557A	Pediatrics Acute Care I	3
NSG	557B	Pediatrics Acute Care II	3
IDS	505	Palliative Care	2
NSG	679	Academic Scholarship in Nursing Education	2-4
			Subtotal 16-18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (672 Clock Hours)	8
NSG	607	DNP/Specialty Immersion Residency (168 Clock Hours)	2
			Subtotal 12
			Total 59-61

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

Doctor of Nursing Practice (BSN to DNP)

Area of Focus: APHN/Enhancing Population Health Outcomes

Graduate Nursing Core (transfer from graduate program)			Credit Hours
NSG	522	Applied Biostatistics & Epidemiology for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
			Subtotal 6
DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
			Subtotal 6
Population/Role Cognates			Credit Hours
NSG	565	Advanced Nursing Roles in Public Health Systems	3
NSG	566	Population Assessment and Health Promotion Frameworks	3
NSG	567	Population Intervention Planning, Implementation, and Evaluation	3
NSG	568	Environmental Health	3
NSG	536	Case Management Across the Health Care Continuum	3
NSG	611	Understanding Financial and Business Concepts	3
NSG	612	Applied Organizational Analysis and the Management of Human Resources	3
NSG	613	Data and Decision Making for Strategic Outcomes Management	3
NSG	614	The Leader & Policy, Politics, Power, and Ethics	3
Cognates			9
			Subtotal 36
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	Practicum (756 Clock Hours)	9
NSG	607	Immersion Residency (252 Clock Hours)	3
			Subtotal 14
			Total 62

Doctor of Nursing Practice (MSN to DNP – non-APRN)

Area of Focus: APHN/Enhancing Population Health Outcomes

DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
			Subtotal 6
Population/Role Cognates			Credit Hours
NSG	565	Advanced Nursing Roles in Public Health Systems	3
NSG	566	Population Assessment and Health Promotion Frameworks	3
NSG	567	Population Intervention Planning, Implementation, and Evaluation	3
NSG	568	Environmental Health	3
NSG	536	Case Management Across the Health Care Continuum	3
NSG	611	Understanding Financial and Business Concepts	3
NSG	612	Applied Organizational Analysis and the Management of Human Resources	3
NSG	613	Data and Decision Making for Strategic Outcomes Management	3
NSG	614	The Leader & Policy, Politics, Power, and Ethics	3
			Subtotal 27
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (756 Clock Hours)	9
NSG	607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
			Subtotal 14
			Total 47

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (BSN to DNP)

Population/Role: Nurse Anesthesia (CRNA)

Graduate Nursing Core			Credit Hours
NSG	521	Organizational and Systems Leadership	3
NSG	522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG	523	Research for Evidence-Based Practice	3
NSG	524	Health Promotion in Individuals & Clinical Populations	3
NSG	625	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan	2
			Subtotal 14
Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	537	Transition to APRN Role	3
			Subtotal 13
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
ANA	500	Neurobiology	3
NSG	541	Chemistry and Physics in Anesthesia	3
NSG	542	Nurse Anesthesia Pharmacology	3
NSG	543A	Anesthesia Principles I: Basic Principles of Nurse Anesthesia	3
NSG	543B	Anesthesia Principles II: Advanced Principles of Nurse Anesthesia	3
NSG	543C	Anesthesia Principles III: Obstetric & Pediatric Anesthesia	3
			Subtotal 18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP Practicum (756 Clock Hours)	9
NSG	607	DNP Immersion Residency (1512 Clock Hours)	18
			Subtotal 29
			Total 86

Doctor of Nursing Practice (MSN to DNP)

Population/Role: Nurse Anesthesia (CRNA)

Advanced Practice Nursing Core			Credit Hours
NSG	625L	Advanced Health Assessment for Advanced Practice Nursing Across the Lifespan: Lab	1
NSG	532	Advanced Physiology	3
NSG	533	Advanced Pathophysiology	3
NSG	531	Advanced Pharmacology	3
NSG	537	Transition to the APRN Role	3
			Subtotal 13
DNP Core			Credit Hours
NSG	603	Effective Project Planning, Implementation, and Evaluation	3
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
NSG	604A	DNP Project Planning I	1
NSG	604B	DNP Project Planning II	1
NSG	604C	DNP Project Planning III	1
			Subtotal 12
Population/Role Cognates			Credit Hours
ANA	500	Neurobiology	3
NSG	541	Chemistry and Physics in Anesthesia	3
NSG	542	Nurse Anesthesia Pharmacology	3
NSG	543A	Anesthesia Principles I: Basic Principles of Nurse Anesthesia	3
NSG	543B	Anesthesia Principles II: Advanced Principles of Nurse Anesthesia	3
NSG	543C	Anesthesia Principles III: Obstetric & Pediatric Anesthesia	3
			Subtotal 18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (756 Clock Hours)	9
NSG	607	DNP/Specialty Immersion Residency (1512 Clock Hours)	18
			Subtotal 29
			Total 72

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours.

The equivalent of Advanced Health Assessment Across the Lifespan, Research and Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Doctor of Nursing Practice (MSN to DNP)

Area of Focus: Systems Leadership

Term 1			Credit Hours
NSG	603	Effective Project Planning, Implementation, & Evaluation	3
NSG	602	Healthcare Economics, Policy, & Finance	3
			Subtotal 6
Term 2			Credit Hours
NSG	612	Applied Organizational Analysis & Management of Human Resources	3
NSG	613	Data and Decision Making for Strategic Outcomes Management	3
NSG	604A	DNP Project Planning I	1
			Subtotal 7
Term 3			Credit Hours
NSG	611	Financial and Business Concepts	3
NSG	614	The Leader and Policy, Politics, Power, & Ethics	3
NSG	604B	DNP Project Planning II	1
			Subtotal 7
Term 4			Credit Hours
NSG	600	Leadership in an Evolving Healthcare Environment	3
NSG	604C	DNP Project Planning III	1
NSG	682	<i>Developing Professional Writing Skills [Optional]</i>	3
			Subtotal 4-7
Term 5			Credit Hours
NSG	607	DNP/ Specialty Immersion Residency	3
NSG	679	<i>Academic Scholarship in Nursing [optional] (2-4 credit hours)</i>	2-4
			Subtotal 3-7
Term 6			Credit Hours
NSG	605	DNP Capstone	2
NSG	607	DNP/ Specialty Immersion Residency	3
			Subtotal 5
			Total 32-39

Doctor of Nursing Practice (MSN to DNP – APRN)

Area of Focus: Leadership to Enhance Population Health Outcomes

DNP Core			Credit Hours
NSG	600	Leadership in Evolving Healthcare Environments	3
NSG	602	Healthcare Economics, Policy, and Finance	3
			Subtotal 6
Population/Role Cognates			Credit Hours
NSG	565	Advanced Nursing Roles in Public Health Systems	3
NSG	566	Population Assessment and Health Promotion Frameworks	3
NSG	567	Population Intervention Planning, Implementation, and Evaluation	3
NSG	536	Principles of Case Management Across the Health Care Continuum	3
	or		
NSG	568	Environmental Health	3
NSG	611	Understanding Financial and Business Concepts	3
NSG	614	The Leader & Policy, Politics, Power, and Ethics	3
			Subtotal 18
DNP Practica and Capstone			Credit Hours
NSG	605	DNP Capstone (168 Clock Hours)	2
NSG	606	DNP/Specialty Practicum (252 Clock Hours)	3
NSG	607	DNP/Specialty Immersion Residency (168 Clock Hours)	2
			Subtotal 7
			Total 31

A review of the MSN applicant's transcript will be conducted to determine any modifications that may be required in course work or clinical hours. It is expected that previous clinical hours plus DNP/Specialty Practicum and Immersion hours will be equal to or greater than 1000 clock hours.

The equivalent of Biostatistics/Epidemiology must be completed prior to admission or added to the plan of study.

Post-Graduate Certificate (PGC)

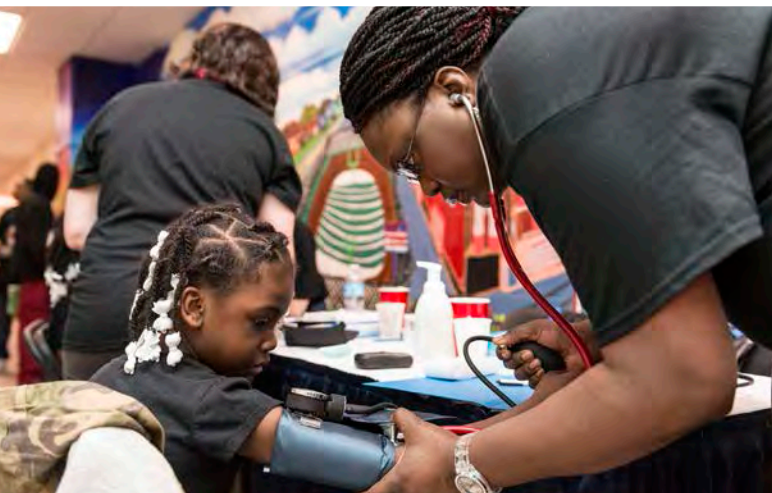
The Post-Graduate Non-Degree Certificate is intended for nurses who already have an advanced practice graduate degree in nursing (MSN or DNP) who wish to specialize in a different clinical area. It is expected that the following courses or their equivalent are completed prior to admission to the post-graduate certificate program: Advanced Health Assessment Across the Lifespan, Physiology and/or Pathophysiology, Advanced Pharmacology, APRN Role and Diagnostics. Review of these courses for equivalence and transfer credit will be done upon admission into the program.

Post-Graduate Advanced Practice Certificate Options:

- Neonatal
- Pediatric Acute Care
- Pediatric Primary Care
- Psychiatric-Mental Health

Specialty Curriculum Content	Credit Hours
Applied Pharmacology	3
Specialty Cognate	3
Management: I	3
Management: II	3
Management III	3
	Subtotal 15
DNP and Specialty Practica	Credit Hours
Specialty Practicum (336 Clock Hours)	4
Specialty Immersion Residency (168 Clock Hours)	2
	Subtotal 6
	Total 21

For more information about graduation rates, the median debt of students who completed the program and other important information, please visit <http://www.rushu.rush.edu/disclosures/nursingcert>.



RUSH UNIVERSITY

College of Health Sciences



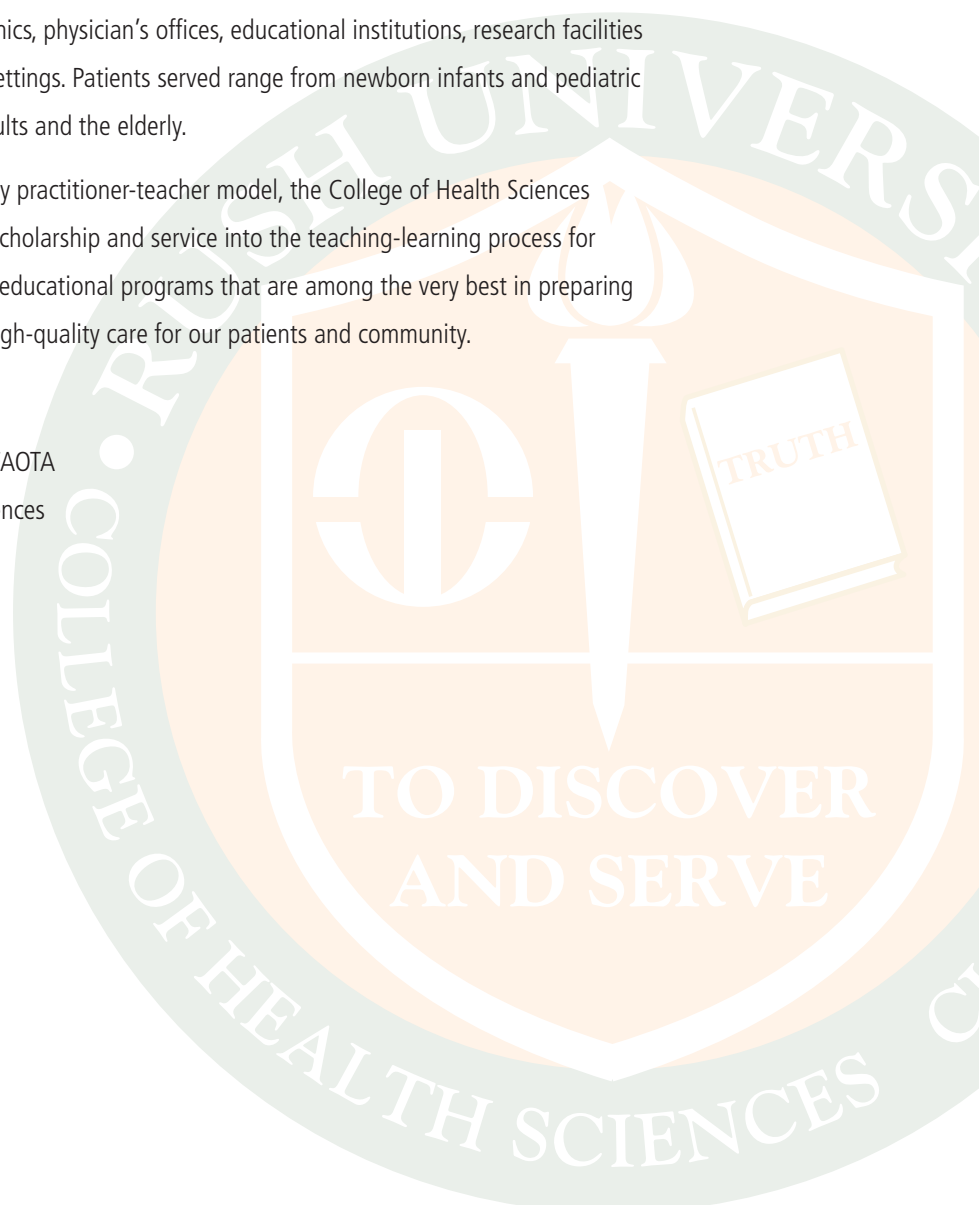
Welcome to the College of Health Sciences



The College of Health Sciences offers outstanding educational programs for the preparation of allied health and health care management professionals. There are more than 200 different allied health fields, and allied health workers constitute nearly 60 percent of the health care workforce in the United States. Because of advances in treatment and technology, population growth and the aging of the population, the demand for allied health professionals is expected to increase significantly. Allied health professionals and managers work in many different health care settings including acute care, chronic care, primary care, community-based care, clinics, physician's offices, educational institutions, research facilities and industry settings. Patients served range from newborn infants and pediatric patients to adults and the elderly.

In keeping with the Rush University practitioner-teacher model, the College of Health Sciences integrates patient care, research, scholarship and service into the teaching-learning process for our students. We strive to provide educational programs that are among the very best in preparing graduates to provide accessible, high-quality care for our patients and community.

Charlotte B. Royeen, PhD, OTR/L, FAOTA
Dean of the College of Health Sciences



Overview

The College of Health Sciences, founded in 1975, is responsible for education and research in the allied health professions, including health care management. Rush University educates students as practitioners, scientists, teachers and leaders. The College of Health Sciences, as an integral component of Rush University, seeks to prepare superb allied health practitioners and leaders to provide the very best care for our patients. In addition, the college makes meaningful and significant contributions to advancing health care through research, scholarship, service and practice.

The College of Health Sciences offers programs in 14 different professional areas housed within 10 academic departments. The college includes the departments of Cardiopulmonary Sciences (Perfusion Technology and Respiratory Care); Clinical Nutrition; Communication Disorders and Sciences (Audiology and Speech-Language Pathology); Health Systems Management; Medical Laboratory Science; Medical Physics and Advanced Imaging (Imaging Sciences, Medical Physics, and Vascular Ultrasound); Occupational Therapy; Physician Assistant Studies; and Religion, Health and Human Values. Programs and degrees offered within the college include the doctor of audiology (AuD); medical laboratory science (BS, MS); clinical laboratory management (MS); specialist in blood bank (certificate); clinical nutrition (MS); health sciences (BS); health systems management (MS); imaging sciences (BS); medical physics (residency); occupational therapy (MS); perfusion technology (BS, MS); physician assistant studies (MS); research administration (MS); respiratory care (BS, MS); speech-language pathology (MS); and vascular ultrasound technology (BS). Through the Division of Health Sciences within the Graduate College, the PhD in Health Sciences is offered.

Organization

The organization of the College of Health Sciences centers around departments and programs, each headed by a department chairperson and program director who reports to the college Dean.

The senior administrative and policy body of the college is the Chair's Council, made up of the chairpersons from each of the college's departments and a representative from the Faculty Council. The senior representative body of the college is the Faculty Council, composed of two faculty members elected from each department. Meetings of the Faculty Council are ordinarily held quarterly. Faculty may propose agenda items, and guests are welcome by invitation.

Alumni Activities

Outstanding educational programs have outstanding alumni, and the college encourages the development of strong ties with its graduates. All graduates are considered alumni of Rush University College of Health Sciences. No dues are levied for membership in the college alumni association. In addition, each of the programs in the College of Health Sciences has an individual program alumni organization.

Further information about the College of Health Sciences can be obtained by contacting the Dean's Office at:

College of Health Sciences Dean's Office
Rush University
600 South Paulina Street
Suite 1001 Armour Academic Center
Chicago, IL 60612-1832
Tel: (312) 942-7120
Fax: (312) 942-2100

Mission and Vision

The purposes of Rush University are to educate students as practitioners, scientists and teachers who will become leaders in advancing health care and to further the advancement of knowledge through research. The College of Health Sciences, as an integral component of the University, seeks to prepare superb practitioners and leaders in the allied health professions to provide the very best care for our patients. In addition, the college seeks to make meaningful and significant contributions in advancing health care through excellence in research, scholarship and service. In keeping with the Rush University practitioner-teacher model, the college integrates patient care, research, scholarship and service into the teaching-learning process of developing future allied health professionals and leaders.

Mission

The mission of the College of Health Sciences is to advance the quality and availability of health care through excellence in education, research and scholarship, service and patient care. The college promotes the values of diversity, access and inclusion in all of its endeavors.

Vision

The College of Health Sciences at Rush University will be a world-class school of allied health sciences whose programs are recognized as among the best in the United States.

Admission Requirements

Admission to the College of Health Sciences programs is on a competitive basis. Student selection is based on a number of factors including overall grade point average, prerequisite or science grade point average, consistency of academic performance, coursework completed prior to application, examination scores, prior health care and life experiences and interpersonal abilities. Graduate Record Examination (GRE) score submission and a personal interview may be required by certain College of Health Sciences programs. For information on how to gain admission to a specific College of Health Sciences program, please consult the web pages for the department.

Application Procedure

Application for admission into programs offered in the College of Health Sciences varies by program. For more information on application procedures, please consult the specific web pages for the program and department.

TOEFL Policy

All applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language examination (TOEFL).

A total TOEFL score of at least 88 on the Internet-based version, 570 on the paper-based version or 230 on the computer version must be achieved. In addition, applicants must score no less than 55 on the paper version, 20 on the computer version or 18 on the Internet-based version **on each of the three subtests of the TOEFL** (listening, structure/writing and reading).

An official report of these scores must be received by the Admissions Office prior to the date(s) on which admission decisions are made for the program(s) to which the applicant has applied. To obtain information or to register to take the TOEFL, write directly to:

The Education Testing Service
P.O. Box 6151
Princeton, New Jersey 08541-6151, U.S.A.

You may also wish to visit the TOEFL website at <http://www.toefl.org>. The applicant should indicate on his or her application for the examination that results should be sent to institution code number 1676.

Applicants whose native language is not English and who have graduated from high school or successfully completed a higher-education degree program (associate degree or higher) in the United States or one of its English-speaking protectorates **may petition for waiver of the TOEFL requirement** to the College of Health Sciences Dean's Office.

Waiver requests should include proof of receipt of a high school or college diploma from an accredited institution in the United States or one of its English-speaking protectorates. College or university degrees must be granted by a regionally accredited college or university to be considered for waiver of the TOEFL.

Philosophy of General Education

Undergraduate programs at Rush University prepare entry-level professionals for various roles in health care. The University strives to provide an environment where knowledgeable, informed and literate students are prepared to take their place, not only in the health care arena, but also as citizens of the world. The professional education builds on a solid general education, which forms the basis for life-long learning and prepares graduates to be practitioners with social consciences. Students are admitted to Rush University with general education sufficient to lay the groundwork for developing excellent written and verbal communication skills, critical thinking abilities, cultural sensitivity, high ethical standards and an inquiring mind. Students are expected to enter Rush University with foundations in communications, humanities, mathematics, physical/life sciences and social sciences.

The professional education offered by the University completes the student's general education, resulting in a graduate who:

- Communicates effectively in writing and speech
- Demonstrates intellectual curiosity and critical thinking in the application of math and science to practice
- Applies ethical principles to practice
- Demonstrates ability to practice effectively in a diverse society
- Exercises/expresses his or her social conscience to positively influence health care at local to global levels

General Education Requirements

Effective January 1, 2009, all entering students¹ must complete the following general education requirements in order to be eligible for the Bachelor of Science degree:

Requirements ²	Semester Hours	Quarter Hours ³
Two courses in communications (English or composition)	6	9
One course in mathematics (college algebra or higher)	3	4
Two courses in life sciences (anatomy, biology, microbiology or physiology)	6	9
One course in physical sciences (chemistry or physics)	3	4
One course in social sciences (government, history, political science, psychology or sociology)	3	4
One course in humanities, ethics, fine arts, literature or philosophy (may not include a performance course)	3	4
Elective courses in communications, computer science, ethics, fine arts, humanities, life sciences, literature, philosophy, physical sciences or social sciences to total 36 semester (56 quarter) hours	36	56
Total Hours of Required and Elective Courses	60	90

1. These requirements do not apply to students entering the College of Health Sciences prior to January 1, 2009.

2. Minimum course and credit hour requirements for the Bachelor of Science degree are listed. Most College of Health Sciences programs require additional prerequisite courses and/or general education courses from the areas listed above. Applicants should review the specific prerequisite and general education requirements for the program(s) for which they are applying.

3. For students completing courses on the quarter system, actual credit awarded (and required) may be less. Please check with your academic program.

Academic Policies

Undergraduate Enrollment in Graduate Courses

With permission from the department chairperson or program director, undergraduate students may register for graduate-level courses. Credit earned in this manner may apply toward the baccalaureate degree, pending approval by the department chairperson or program director. Should an undergraduate student later apply for and gain admission to a graduate program at Rush University, the student may request that graduate credit previously earned be applied toward the master's degree. A Petition to Transfer Credit form should be completed. Forms are available from the Office of the Registrar or from the website (www.rushu.rush.edu/registrar). Credit transferred in this manner is limited. A student must earn a minimum of 180 quarter hours to receive the Bachelor of Science degree. If a student actually earns 187 quarter hours, for example, and seven quarter hours are at the graduate level at Rush, seven quarter hours may be credited toward the master's degree.

Examination Policy

The examination policy is the responsibility of the individual course director who will inform students of examination requirements for that particular course. A time period at the end of the quarter is provided for examinations. This time period may be used as the course director chooses.

Readmission

Any student who has withdrawn from a program or has not been enrolled for one or more quarters or any dismissed student may apply for readmission by submitting an application for this purpose. Applications for re-enrollment must be received at least three months before the planned return. An interview may be required. A re-entering student must meet the conditions for re-enrollment stated in his or her dismissal or re-entry acceptance letter and all policies, requirements and course sequences in effect at the time of re-entry. Previously enrolled students may be considered as part of the pool of new applicants and are not guaranteed admission. The student will pay tuition and fees at the rates in effect at the time of re-enrollment.

Rush University Academic Policies

The Academic Resources and Policies section of this catalog contains additional Rush University academic policies.

Student Professional and Community Service Requirement

Participation in service activities is an important attribute of the health science professional. A hallmark of outstanding Rush students and alumni is the desire and ability to make meaningful service contributions. Community service activities may include volunteer activities (health fairs and clinics, health education, provision of health services to at risk or disadvantaged populations and other outreach education or clinical activities) and service on community boards, committees, work groups and other service activities that promote the health and well-being of the community and its members. Professional service may include participation in the provision of state, national or international activities to advance the quality, access and effectiveness of health care services provided by allied health professionals.

Achievement of the College of Health Sciences Excellence in Service Goal is demonstrated in part through:

1. Student and faculty participation in community service activities
2. Student satisfaction with and appreciation for community service
3. Students and faculty who provide leadership and support to professional associations, boards and committees
4. Provision of community and professional continuing education to local, national and international audiences

In order to support achievement of the College's service excellence goals and objectives, the College has developed a professional and community service requirement for all College of Health Sciences students as a part of their academic programs.

As a requirement for program completion, each academic degree granting program will establish a minimum service requirement for each student enrolled in the program of at least 16 contact hours of approved professional or community service.

Examples of activities that may be used to meet this requirement include participation in community health fairs; community health screening and/or health services; provision of community health education; participation in approved professional service and/or continuing education activities; and assistance with the

delivery of seminars, lectures, workshops and related community or professional continuing education activities.

This program requirement will be required for satisfactory course completion for at least one course in the student's prescribed course of studies. As an alternative, the requirement may be listed as a graduation requirement for the program in the catalog and program handbook.

Conduct and Ethics

Each student is expected to conduct himself or herself in a professional manner at all times—in a manner which conforms to the ethics of the health professions and which instills confidence in the student's abilities as a health care professional. Each student is expected to conform to the professional code of ethics as outlined in his or her departmental student handbook.

Irresponsible, unprofessional or unethical behavior may result in disciplinary action, which may include suspension or dismissal from the college. All clinical agency or hospital regulations are to be followed by students when undergoing clinical or other training in a facility. For additional information, students should refer to the Rush University Statement on Academic Honesty and Student Conduct and the Rush University Medical Center Code of Conduct.

Scholastic Dishonesty and Cheating

The College of Health Sciences will not condone cheating in any form. Allegations of cheating will be reviewed by the departmental Committee on Progress and Promotions.

Any student found to be cheating on an examination may receive a "0" for the examination and will be subject to formal disciplinary action, which may include suspension or dismissal from the program. Failure to report incidents involving scholastic dishonesty on the part of another student will be considered unprofessional conduct and may also result in disciplinary action. Students should refer to the Rush University Policy on Academic Honesty and Student Conduct for further information.

HIPAA and Patient Privacy

Rush University students have a legal and ethical responsibility to safeguard the privacy of all patients and protect confidentiality and security of all health information. Protecting the confidentiality of patient information means protecting it from unauthorized use or disclosure in any format — verbal, fax,

written or electronic/computer. Patient confidentiality is a central obligation of patient care. Any breaches in patient confidentiality or privacy may result in disciplinary action, up to and including dismissal from the college.

The laboratory component of some courses may use students as simulated patients. This is particularly true for the patient evaluation, medicine and patient education components. Additionally, the sharing of personal experiences can be a rich resource in the development of students' understanding, knowledge and appreciation of disease, health care and impact on peoples' lives.

Practicing the medical history and physical examination of patients places students in close contact and leads to the sharing of personal information and physical findings. Similarly students may use personal experiences in patient role-playing exercises.

All shared and personal medical information and physical examination findings are to be treated with utmost confidentiality, the same as for any patient contact. Failure to protect the confidentiality of any information related to the activities in a course or clinical rotation may result in disciplinary action, up to and including suspension or dismissal from the college. For additional information, students should refer to the Rush University HIPAA policy and the Rush University Policy on Privacy and Confidentiality of Student Records and FERPA.

Guide to Professional Conduct

Professionalism relates to the intellectual, ethical, behavioral and attitudinal attributes necessary to perform as a health care provider or manager. As it applies to his or her professional role, the student will be expected to:

Attention

1. Demonstrate awareness of the importance of learning by asking pertinent questions, identifying areas of importance in practice and reporting and recording those areas.
2. Avoid disruptive behavior in class, laboratory and clinical or practicum rotations, such as talking or other activities that interfere with effective teaching and learning.

Participation

1. Complete assigned work and prepare for class, laboratory and clinical or practicum objectives prior to attending.
2. Participate in formal and informal discussions, answer questions, report on experiences and volunteer for special tasks and research.
3. Initiate alteration in patient care techniques when appropriate via notification of instructors, staff and physicians.

Dependability and Appearance

1. Attend and be punctual and reliable in completing assignments with minimal instructor supervision.
2. Promote a professional demeanor by appropriate hygiene, grooming and attire.

Communication

1. Demonstrate a pleasant and positive attitude when dealing with patients and coworkers by greeting them by name, approaching them in a non-threatening manner and setting them at ease.
2. Explain procedures clearly to the patient.
3. Ask patients how they feel and solicit patient comments regarding the patient's overall condition and response to assessment and/or therapy.
4. Communicate clearly to staff and physicians regarding the patient status, utilizing appropriate charting, oral communication and the established chain of command.
5. Demonstrate a pleasant and positive attitude when dealing with coworkers, instructors, faculty, nurses and physicians.

Organization

1. Display recognition of the importance of interpersonal relationships with students, faculty and other members of the health care team by acting in a cordial and pleasant manner.
2. Work as a team with fellow students, instructors, nursing staff and the physician in providing patient care.
3. Organize work assignments effectively.
4. Collect information from appropriate resources.
5. Correlate care to overall patient condition.
6. Adapt care techniques to overcome difficulties.
7. Devise or suggest new techniques for patient welfare or unit efficiency.

Safety

1. Verify identity of patients before initiating therapeutic action.
2. Interpret written information and verbal directions correctly.
3. Observe and report significant changes in patient's condition promptly to appropriate person(s).
4. Act to prevent accidents and injury to patients, personnel and self.
5. Transfer previously learned theory and skills to new/different patient situations.

6. Request help from faculty/staff when unsure.
7. Comply with hospital and university guidelines for performance.

Examples of critical errors in professional conduct and judgment include:

1. Failure to place the patient's welfare as first priority
2. Failure to maintain physical, mental and emotional composure
3. Consistent ineffective/inefficient use of time
4. Failure to be honest with patients, faculty and colleagues
5. Scholastic dishonesty in any form
6. Failure to follow the Rush University Medical Center Code of Conduct

Procedure for Unprofessional Conduct

For specific rules regarding the procedures for unprofessional conduct, please refer to the departmental or program student handbook. In general, for issues that are not satisfactorily resolved between the instructor and student, the following guidelines should be followed for unprofessional conduct:

Step 1. The student will have been identified as violating an established standard of professional conduct/judgment or moral/ethical behavior, and the department chair or program director will have been notified.

Step 2. The department chair or program director will meet with the individual(s) making the allegation and the student's faculty advisor to review the available information and determine the veracity of the allegations.

Step 3. The department chair, student and faculty advisor, whenever possible, will meet as promptly as possible after the alleged incident. The department chair will report to the student the facts and available information and will seek to authenticate or clarify the allegations where possible. If it is determined that there is no basis for the allegation, no further action will be taken.

Step 4. If it is determined that there is a basis for the allegation and that further investigation is necessary, a preliminary hearing of the departmental Committee on Progress and Promotions will be convened to review the allegations and recommend a course of action. The department chair will inform the student and the Dean in writing of the preliminary hearing and the following:

- a) Date
- b) Name of student
- c) Nature of the allegations
- d) Date of alleged incident/occurrence

- e) Professional attributes that allegedly violate standards: skill, behavior, judgment, ethical values, etc.

For more information regarding the procedures for handling instances of unprofessional conduct, see the current departmental student handbook, the University Catalog and the College of Health Sciences Policies and Procedures for the Rush University Rules for Governance.

Incidents in the Clinical Agency

An incident occurring that affects patients' or staff's well-being or the patient's prescribed care will be reported to the clinical instructor or preceptor immediately. An institutional incident report will then be completed following the policy of the health care institution or hospital in which the incident occurred. A duplicate of the hospital incident report as well as a memorandum of explanation from the clinical instructor or preceptor will be placed in the student's clinical file, and the department chair, program director or clinical director will be notified immediately. Incidents involving gross errors in judgment or practice on the part of the student will constitute grounds for dismissal from the program.

Criminal Background Checks and Drug Testing

Programs offered in the College of Health Sciences often require that clinical rotations, practica, internships or other learning experiences be successfully completed in hospitals and other health care facilities in order to meet program requirements. Because use of these facilities is required, students must be able to successfully complete their assigned rotations in order to fulfill the academic requirements of their program.

Hospitals and other health care facilities often have policies requiring criminal background checks for employees, students and volunteers. These facilities may refuse to accept individuals for clinical, practicum or other experiential rotations based on past criminal convictions.

Students should be prepared to comply with the policies and procedures at any facility where they are assigned as part of their educational program and may not request facility assignments in an effort to avoid specific requirements. Students who have certain types of information in their criminal background checks may be ineligible to complete rotations in specific facilities. Students who are not allowed to participate at assigned facilities or who are terminated from rotations based on the results of a criminal background check will be unable to complete the program requirements for graduation and will be subject to dismissal on academic grounds.

Students should also be advised that persons with certain types of criminal convictions may not be eligible for state licensure and/or national registry or certification. In addition, many employers perform criminal background checks and may not hire individuals with certain types of criminal convictions.

Drug Testing

Hospitals and other health care facilities often have policies requiring drug testing for employees, students and volunteers. Some facilities provide that students who test positive for drugs are ineligible to complete clinical, practicum or work assignments in that facility. Students should be prepared to comply with the policies and procedures at any assigned facility and may not request facility assignments in an effort to avoid drug screening requirements. Students who fail to report for clinical or practicum assignments or who are terminated from rotations because they violate the drug-testing or drug-use policies of the facilities will be subject to dismissal from the program.

Procedures for the Implementation of an Academic Accommodation for Students with Disabilities

After approval of a request for an academic accommodation by the Rush University Student Disability Assessment Team (RUSDAT), the college representative to RUSDAT (the Representative) in the College of Health Sciences will be notified regarding the granted accommodation. The Representative will schedule a meeting with the student to discuss the accommodation and to identify any special circumstances that may need to be considered with regard to its implementation. The student will sign a release allowing the Representative to communicate with individuals in the student's program on a need-to-know basis about the accommodation and to discuss its purpose and rationale. The Representative will coordinate the implementation of the accommodation. Accommodation arrangements will be made by the department. Students are responsible for aids or assistance of a personal nature such as wheelchairs, hearing aids, computers and attendants for services to be used at home or on campus. The student with a disability is responsible for contacting the Representative if he or she feels that the approved accommodations are not being implemented as recommended.

The Representative will meet with the student at least once each academic year to evaluate the effectiveness of the accommodation; the resulting academic outcomes; and the need to continue, modify or expand the accommodation. The student will meet with the Representative at a time that is mutually agreeable for the purpose of completing this evaluation. The Representative may consult with faculty or other appropriate individuals to

obtain information that will be helpful in evaluating the success of student accommodations. Any requests for changes to the student accommodation resulting from this meeting will need to be submitted by the student to the RUSDAT Team for further consideration and a decision regarding approval.

Student Government

A Student Government Association exists for the students enrolled in the College of Health Sciences. Student representatives will be elected by the student body in such a manner as to provide appropriate representation for all students in the College of Health Sciences.

Release of Student Information

Students must sign a release requesting enrollment verification, verification of degree, recommendations, letters of reference or release of other student information. For a "Letter of Degree or Enrollment Verification," the student should use the form provided by the Office of the Registrar. The Office of the Registrar is the only authorized office at Rush University to release enrollment or degree verification information.

For recommendations or letters of reference, a release form is required for personally identifiable information from a student's education record given out by the College of Health Sciences faculty. (Please note: The College of Health Sciences requires that all recommendations or letters of reference — even if they are based upon the recommender's personal observation or knowledge — have a release form on file before the person writing the recommendation can release the recommendation or letter of reference.)

Student grades will not be posted and cannot be given out over the telephone or via email.

For additional information, students should refer to the Rush University Policy on Privacy and Confidentiality of Student Records and FERPA.

Student Academic Appeal and Grievance Procedures

The College of Health Sciences student appeals and grievance procedures provide a mechanism whereby any student may obtain a review of a complaint of unfair treatment. The student appeals procedures shall not be used to question a rule, procedure or policy established by an authorized faculty or administrative body. Rather it shall be used to provide due process for those who believe that a rule, procedure or policy has been applied in

an unfair or inequitable manner, or that there has been unfair or improper treatment by a person or persons. Students who are appealing an academic decision that could result in a dismissal from the university may be allowed to continue to progress in the program until the issue is resolved. If the academic decision is upheld and the student is dismissed from the university, the student will be withdrawn from the current classes. This withdrawal will be backdated to before the beginning of the quarter and the student will receive 100 percent tuition reimbursement for that quarter.

A student wishing to appeal an academic decision should follow the process summarized below, in the sequence indicated.

Step 1. In the academic community, the responsibility for course development, course delivery and the assessment of student achievement rests primarily with each course instructor. Any student who has a complaint of inappropriate treatment related to a course should first seek to resolve it informally with the course instructor. If the course instructor is the department chairperson or if the complaint does not pertain to a specific course, the student should seek resolution with the department chairperson at the outset.

1. A student with such a complaint must request reconsideration, in writing, of the application of a rule, procedure or policy, or unfair or improper treatment within five working days following the incident that forms the basis for the complaint (e.g., five days after grades are posted).
2. The instructor will meet with the student (or speak with the student via telephone for those students who are unable to come to the instructor's office, if so requested by the student). The instructor will notify the student in writing of his or her decision regarding the complaint within five working days following the meeting or discussion.

Step 2. If resolution is not achieved informally, as described in Step 1, the student should seek resolution with the chairperson of the department in which the course is offered within five working days following notification by the instructor of his or her decision.

1. The chairperson will meet with the student (or speak with the student for those students unable to come to the chairperson's office if so requested by the student) following receipt of the student's request for resolution to discuss the problem or complaint.
2. The chairperson will notify the student of his or her decision in writing following the meeting or discussion.

Step 3. If the issue was not resolved in Step 2, the student may submit a written appeal, describing the nature of the student's

complaint and reasons for seeking an appeal to the student progress and promotion committee of the department within five working days following notification by the department chairperson of his or her decision

1. The student may appear before the committee in person, make an oral statement and answer questions from the committee. The student will not be allowed to be present during committee deliberations.
2. The committee may request that the course instructor or faculty member named in the grievance appear before the committee to make an oral statement and answer questions. The instructor or faculty member named in the grievance may not be present during committee deliberations.
3. Following review of information provided, the committee will notify the student of its decision.

Step 4. If the issue was not resolved to the student's satisfaction in Step 3 the student may submit a written request seeking a hearing to the Dean within five working days of receiving the department progress and promotion committee decision. The written request should include a description of the complaint and the reason the student is seeking an appeal.

1. The Dean will meet with the student following receipt of the written request from the student for a hearing.
2. Following the meeting with the student, the Dean may render a decision or choose to appoint a panel to investigate the grievance and make a recommendation to the Dean.
3. Following review of the information provided and any recommendations from the panel, should one be appointed, the Dean will then notify the student of his or her decision. The decision of the Dean shall be final.

Committees

The senior administrative and policy body of the College of Health Sciences is the Chairs Council. Its membership consists of the chairpersons of each of the college's departments and a representative of the Faculty Council. The senior representative body of the College of Health Sciences is the Faculty Council. Its membership is composed of faculty members representing all departments and ranks. The Committee on Senior Faculty Appointments and Promotions recommends all promotions and appointments of faculty to senior ranks. It is elected by the faculty and has representatives from all departments in the college. In addition, the Dean may appoint special committees and task forces of the college to meet specific college needs, such as strategic planning.



College of Health Sciences Academic Programs

Clinical Nutrition (MS) and the
Combined MS/Dietetic Internship

Communication Disorders and Sciences

Audiology (AuD)

Speech-Language Pathology (MS)

Doctor of Philosophy in Health Sciences (PhD)

Health Sciences (BS)

Health Systems Management (MS)

Imaging Sciences (BS)

Medical Laboratory Science (BS or MS)

Medical Physics (Residency)

Occupational Therapy (MS)

Perfusion Technology (BS or MS)

Physician Assistant Studies (MS)

Research Administration (MS)

Respiratory Care (BS or MS)

Specialist in Blood Bank Certificate and
Clinical Laboratory Management Program (MS)

Vascular Ultrasound (BS)

Clinical Nutrition: Academic Programs

Two programs, which have a common core of courses, lead to a Master of Science (MS) in Clinical Nutrition.

Combined Master's Degree/Dietetic Internship

The combined MS/Dietetic Internship program is a 21-month program that integrates didactic and practicum experience. All students complete a thesis research project. Upon completion of the program, the student earns a MS degree with a major in Clinical Nutrition, completes an accredited dietetic internship and is eligible to take the Registration Examination for Dietitians.

The dietetic internship is accredited by the Accreditation Council for Education in Nutrition and Dietetics, the credentialing agency of the Academy of Nutrition and Dietetics. Contact information:

Accreditation Council for Education in Nutrition and Dietetics
Academy of Nutrition and Dietetics
120 South Riverside Plaza, Suite 2000
Chicago, IL 60606-6995
Tel: 1(800) 877-1600 ext. 4727
www.eatright.org/ACEND

Master's Degree for Registered Dietitians

The MS Degree program for Registered Dietitians (RD) is a program for those who hold the RD credential and wish to expand their understanding of advanced human nutrition and medical nutrition therapy through critical evaluation, integration and application of nutrition and management research. All students complete a thesis research project.

Clinical Nutrition: Admission Requirements

Applicants for the Combined Master of Science (MS)/Dietetic Internship

All applicants for the Combined MS/Dietetic Internship must have earned a baccalaureate degree and completed requirements of an accredited Didactic Program in Dietetics (DPD) listed by the Accreditation Council for Education in Nutrition and Dietetics at www.eatright.org/ACEND.

Application requirements, fees and the application process are specified on the Department of Clinical Nutrition website at www.rushu.rush.edu/nutrition.

Contact Diane Sowa, MBA, RD Dietetic Internship Director, at Diane_C_Sowa@rush.edu or (312) 942-5212 for questions.

Acceptance procedures and timelines for the Combined MS/Dietetic Internship are specified by the Accreditation Council for Education in Nutrition and Dietetics and can be found at www.eatright.org/ACEND. Students are required to follow these directions for acceptance to the program. After students have verbally accepted the appointment, the Rush Dietetic Internship Director will email them an acceptance letter form that students are required to complete and return.

Once students are accepted into the Dietetic Internship, they are then required to complete the application for Rush University at <http://ruapplying.learn.rush.edu>. A program acceptance confirmation fee of \$250 is required at this time. This fee is nonrefundable and will be applied to tuition for the first quarter.

Drug Testing

Rush University Medical Center requires that all prospective employees (including dietetic interns) undergo drug testing as a contingency for employment or enrollment.

Criminal Background Check

All dietetic interns will undergo a criminal background check, the purpose of which is to comply with legislation regarding employment in the health care field to assure patient safety.

Applicants for the MS Degree for Registered Dietitians

Registered Dietitians applying to the MS Degree for Registered Dietitians complete an online application to Rush University at <http://ruapplying.learn.rush.edu>. Application requirements, required application fees and the application process are specified on the Department of Clinical Nutrition website at www.rushu.rush.edu/nutrition. Contact Kathy Keim, PhD, RD, Program Director for the MS Program for RDs, at Kathy_Keim@rush.edu or call (312) 942-2812 for questions.

Acceptance procedures for the MS Degree for Registered Dietitians include a review of application materials by the Rush University College of Health Sciences Admissions Office for completeness of application and a review by the Clinical Nutrition Admissions Committee for program acceptance. Registered Dietitians accepted into the MS Degree for Registered Dietitians program will receive a letter of acceptance from the Rush University College of Health Sciences Admissions Office. A program acceptance confirmation fee of \$250 is required at this time. This fee is nonrefundable and will be applied to tuition for the first quarter.

Required Testing for all Applicants

Applicants for both the MS/Dietetic Internship and the MS for Registered Dietitian programs in Clinical Nutrition will need to submit results of the following:

- Graduate Record Examination results
- International applicants—graduates who obtained their education outside the United States and its territories—must have their academic degree(s) validated as equivalent to the baccalaureate or master's degree conferred by a regionally accredited college or university in the United States. These applicants also must submit results of TOEFL examination (see College of Health Sciences TOEFL requirements).

Clinical Nutrition: Academic Policies

The Combined Master of Science (MS)/Dietetic Internship program is offered on a full-time basis only. The program extends over seven quarters including a summer session. The supervised practice experiences must be completed within 24 months. The didactic and research components of the master's degree should be completed in seven quarters; all students must complete coursework within five years of matriculation. Rush University requires continuous enrollment through to completion of degree (see Rush University policies for further information). Students may be allowed to transfer up to 9 quarter hours of applicable graduate credit from another accredited university. Graduate courses must be completed with a "B" or better and approved by the student's supervisory committee to be awarded transfer credit.

The MS Degree for Registered Dietitians program is offered on a part-time or full-time basis. A full-time student can complete the program in seven quarters; all students must complete the program within five years of matriculation. Students may be allowed to transfer up to 9 quarter hours of applicable graduate credit from another accredited university. Graduate courses must be completed with a "B" or better and approved by the student's supervisory committee to be awarded transfer credit.

If a student is not finished with either program in five years, a request for extension must be made to the Clinical Nutrition Academic Progress and Promotions Committee. If an extension is granted, conditions of the extension may include additional coursework to assure relevancy and currency of knowledge/competence at the master's level.

Academic Progression

Students in the Combined MS/Dietetic Internship program are required to earn grades of "B" or better in NTR-505 and NTR-506 and a grade of "P" (pass) (equivalent to a grade of "B" or better) in NTR-511, NTR-512, NTR-513, NTR-514, NTR-515, NTR-516, NTR-517 and NTR-518. Grades of "C" or better are required in all other courses. Failure to earn minimum required grades may result in dismissal from the Combined MS/Dietetic Internship program and will result in a performance review by the Clinical Nutrition Committee on Academic Progress and Promotions. The faculty reserves the right to request the withdrawal of any student whose conduct or performance demonstrates lack of fitness for continuance in the graduate program.

Students in the MS Degree for Registered Dietitians program are required to earn grades of "C" or better in all courses. Failure to earn required grades may result in dismissal from the MS program and will result in a performance review by the Clinical Nutrition Committee on Academic Progress and Promotions. The faculty reserves the right to request the withdrawal of any student whose conduct or performance demonstrates lack of fitness for continuance in the graduate program.

Automatic probation for any student results when a student's cumulative grade point average (GPA) falls below 3.0 or when a student receives a grade of "D" or "F" in any course. The Clinical Nutrition Committee on Academic Progress and Promotions notifies any student placed on probation, states the reason(s) for probation and indicates the conditions that must be satisfied for removal of probation. A student who earns a grade of "D" or "F" in a course, other than those listed above, must repeat the course and earn at least a "C." A student who earns a grade of "D" or "F" in more than one required course will be dismissed. Full-time students on probation must earn a cumulative GPA of 3.0 or greater by the end of the next two consecutive quarters. Part-time students on probation must earn a cumulative GPA of 3.0 or greater after completing the next 3 courses (approximately 9 quarter hours). Improvement in the GPA must be shown each quarter of probation.

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences and Rush University are located in those sections of the catalog.

Clinical Nutrition: Curriculum Master of Science Degree/Dietetic Internship Program Curriculum

Year 1		Credit Hours
Fall Quarter		
NTR-521	Regulation of Macronutrient Metabolism in Human Nutrition	4
NTR-545	Nutrition Assessment	2
NTR-598	Thesis	1
CHS-502	Research Methods	3
NTR-511	Supervised Experience in Food System Management I	3
Winter Quarter		
NTR-522	Energy Metabolism and Bioactive Compounds in Human Nutrition	2
NTR-541	Integrating Nutrition in Disease Prevention and Treatment I	4
NTR-512	Supervised Experience in Food System Management II	2
NTR-513	Supervised Experience in Clinical Nutrition I	2
NTR-598	Thesis	2
Spring Quarter		
CHS-501	Introduction to Biostatistics for the Health Scientist	3
NTR-542	Integrating Nutrition in Disease Prevention and Treatment II	4
NTR-505	Advanced Medical Nutrition Therapy I	2
NTR-514	Supervised Experience in Clinical Nutrition II	4
Year 2		
Summer Quarter		
NTR-503	Leadership in Dietetics	2
NTR-531	Application of Behavioral Change and Educational Theories in Nutrition Counseling and Education	4
NTR-506	Advanced Medical Nutrition Therapy II	3
NTR-515	Supervised Experience in Clinical Nutrition III	4
Fall Quarter		
NTR-523	Advances in Vitamin and Mineral Nutriture in Human Nutrition	2
NTR-555	Population Studies in Nutrition Epidemiology	2
NTR-598	Thesis	1
NTR-516	Supervised Experience in Clinical Nutrition IV	6
Winter Quarter		
NTR-560	Food and Nutrition Services Management	3
NTR-566	Seminar	1
NTR-598	Thesis	2
NTR-517	Supervised Experience in Clinical Nutrition V	6
Spring Quarter		
NTR-558	Dietetic Public Policy Initiatives and Advocacy	1
NTR-598	Thesis	3
CHS-510	Health Care in America	2
NTR-518	Supervised Experience in Management	3
Hours Required for MS Degree:		83

Master of Science Degree for Registered Dietitians

(Sample plan of study)

Year 1		Credit Hours
Fall Quarter		
NTR-521	Regulation of Macronutrient Metabolism in Human Nutrition	4
NTR-545	Nutrition Assessment	2
NTR-598	Thesis	1
CHS-502	Research Methods	3
Winter Quarter		
NTR-522	Energy Metabolism and Bioactive Compounds in Human Nutrition	2
NTR-541	Integrating Nutrition in Disease Prevention and Treatment I	4
NTR-598	Thesis	1
Spring Quarter		
NTR-542	Integrating Nutrition in Disease Prevention and Treatment II	4
CHS-501	Introduction to Biostatistics for the Health Scientist	3
CHS-510	Health Care in America	2
Year 2		
Summer Quarter		
NTR-531	Application of Behavioral Change and Educational Theories in Nutrition Counseling and Education	4
NTR-503	Leadership in Dietetics	2
Fall Quarter		
NTR-523	Advances in Vitamin and Mineral Nutrition in Human Nutrition	2
NTR-555	Population Studies in Nutrition Epidemiology	2
NTR-598	Thesis	1
Winter Quarter		
NTR-560	Food and Nutrition Services Management	3
NTR-566	Seminar	1
NTR-598	Thesis	2
Spring Quarter		
NTR-558	Dietetic Public Policy Initiatives and Advocacy	1
NTR-598	Thesis	4
Hours Required for MS Degree:		48

Thesis

Several programs in the College of Health Sciences either require or have an option for a thesis project. Completing one's thesis is a significant academic accomplishment and acknowledges that the student has conducted an independent scientific investigation that will add to the knowledge of his or her field. All students are required to have their theses registered with

the ProQuest Information and Learning Company. This process includes the publication of the thesis abstract, the microfilming of the thesis and the copyrighting of the work (approximately \$150). In addition, the original copy of the thesis is bound and becomes a permanent part of the collection of the Library of Rush University Medical Center. The director of the Library of Rush University Medical Center coordinates the process.

Clinical Nutrition: Graduation Requirements

A cumulative GPA of 3.0 or greater is required of all graduates. The Combined MS/Dietetic Internship program students shall complete the internship requirements within 24 months and the MS degree within five years from matriculation. Registered Dietitians enrolled in the MS Degree for Registered Dietitians shall complete degree requirements within five years from matriculation.

Clinical Nutrition: Research Activities

All students will complete a master's thesis. Faculty members of the Department of Clinical Nutrition are involved in basic and applied clinical nutrition and management research. Faculty and students present at professional meetings and publish in peer reviewed journals. A list of faculty and student research presentations and publications can be found at the Clinical Nutrition website at www.rushu.rush.edu/nutrition.

Clinical Nutrition: Service Activities

The practitioner-teacher model is evident in the fully integrated operational and academic facilities/staff, providing unique opportunities for the merging of theory and practice within one institution. Two departments jointly administer the combined MS/Dietetic Internship program. The Department of Food and Nutrition Services at Rush University Medical Center provides the internship or supervised practice experience. The didactic component of the Master of Science degree is provided by the Department of Clinical Nutrition at Rush University. In addition to the academic program, the Department of Food and Nutrition Services provides nutrition services to the hospital and to the outpatient area, operates three foodservice units within the Medical Center and provides leadership in nutrition support in critical care.

Students in both programs are required to complete 16 hours of community or professional service during the program. Students meet this requirement in a variety of ways including assisting at health fairs; volunteering at the local food pantry; and assisting at local, state and national professional association meetings.

Communication Disorders and Sciences: Philosophy

The underlying basis for the graduate degree programs in audiology and speech-language pathology is the practitioner-teacher model, whereby students learn from faculty who take on dual roles as academicians and practitioners. This approach to professional education helps to bridge the gap that can exist between classroom teaching and clinical service delivery. Students learn in an environment where teaching, research, and patient care are wholly integrated. The faculty at Rush participate fully in the clinical process in addition to teaching and research. Students receive outstanding clinical education experiences with diverse patients who present a full range of communicative disorders. The audiology and speech-language pathology programs are accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association (ASHA).

The programs in audiology and speech-language pathology are based on the philosophy that professional education is optimized by drawing upon the patients, staff, and other resources of an academic medical center. The resources at Rush University enrich and enhance faculty and student research and scholarship, and they provide unique opportunities for interprofessional education and collaborations. The clinical skills of Rush students are fostered and developed through didactic courses, clinical observation and instruction, and supervision by practitioner-teachers. The department faculty is supplemented by the expertise of physicians, scientists, and other health care practitioners within the medical center.

The goals of the academic programs in audiology and speech-language pathology are to generate and disseminate new knowledge in the communication disorders and sciences and to prepare graduates who:

- Synthesize contemporary knowledge of speech and hearing science and apply it in the assessment and management of a broad spectrum of communication disorders
- Implement evidence-based protocols for the evaluation and treatment of individuals with communication disorders
- Utilize and contribute to new knowledge in the professions and discipline
- Function as professional-level speech-language pathologists or audiologists in health care and other settings
- Are eligible for clinical certification from the American-Speech-Language-Hearing Association
- Are eligible for state licensure within the profession

Mission Statement of the Department of Communication Disorders and Sciences

The Department of Communication Disorders and Sciences at Rush University Medical Center integrates outstanding graduate education, superior patient care, excellence in research and scholarship, and service to diverse communities.

Vision Statement

The clinical and graduate education programs of the Department of Communication Disorders and Sciences will be recognized as among the best in the United States.

Professional Credentialing

Rush programs in communication disorders and sciences offer the academic and clinical education background necessary to begin the ASHA clinical fellowship year (speech-language pathology) and to meet requirements for certification in audiology and speech-language pathology. Upon graduation students are eligible to:

- Obtain Illinois licensure
- Meet requirements for professional certification in speech-language pathology or audiology
- Meet the requirements for the Illinois Educator License as a non-teaching speech-language pathologist. This is under the School Services Personnel category. Eligibility for the Illinois Educator License may require adjustment to a student's didactic or clinical experiences.

Communication Disorders and Sciences: Admission Requirements

Application for admission to the Doctor of Audiology or the Master of Science in Speech-Language Pathology program is through a central application system. Refer to the programs' web pages for more information. The application deadline for both programs is January 1 for matriculation the following fall.

Doctor of Audiology (AuD)

At the time of application, individuals should have completed or be in the process of completing the baccalaureate degree at accredited institutions. The baccalaureate degree must be completed before commencing work at Rush University. Students entering the program must have transcript credit for at least one college-level math course, at least one course in the behavioral/social sciences, at least one course in the biological

sciences and at least one course in the physical sciences. Although not required, the following coursework is strongly recommended: advanced college-level math, research methods, psychology, and physics. Applicants should check the program web page for additional information about prerequisites.

Admission is granted for the fall quarter of each year. The application file includes a completed application with essay, application fee, three letters of recommendation from individuals acquainted with the applicant's academic background, official transcripts from all universities attended and official scores from the Graduate Record Examination (GRE). Applicants whose native language is not English and who have not obtained a college degree from a U.S. institution must submit official scores from the Test of English as a Foreign Language (TOEFL).

The generally applied minimum standards for acceptance into the AuD program are a 3.0 undergraduate GPA overall (on a 4.0 scale) or a 3.5 GPA in major courses. GRE scores (Verbal and Quantitative) above the 50th percentile are recommended. The department Admissions Committee makes all admissions decisions.

Master of Science in Speech-Language Pathology

At the time of application, individuals should have completed or be in the process of completing the baccalaureate degree at accredited institutions. The baccalaureate degree must be completed before commencing work at Rush University. Students entering the program must have successfully completed coursework in introduction to audiology, phonetics, normal speech and language development, speech and hearing science, speech and hearing anatomy and physiology, and statistics. In addition, entering students must have transcript credit for at least one course in each of the following areas: biological sciences, physical sciences (physics or chemistry), and social/behavioral sciences. Applicants should check the program web page for additional information about prerequisites.

Admission is granted for the fall quarter of each year. The application file includes a completed application with essay, application fee, three letters of recommendation from individuals acquainted with the applicant's academic background, official transcripts from all universities attended, and official scores from the Graduate Record Examination (GRE). Applicants whose native language is not English and who have not obtained a college degree from a U.S. institution must submit official scores from the Test of English as a Foreign Language (TOEFL).

The generally applied minimum standards for acceptance into the program are a 3.0 undergraduate grade point average (GPA) overall (on a 4.0 scale) and a 3.5 in major courses in speech-language pathology or a 3.5 in the prerequisite course content as listed in the application. Scores on the GRE (Verbal and Quantitative) should be at the 50th percentile or higher. The Admissions Committee in the department reviews all applications and makes all admissions decisions.

Technical Standards for the Audiology and Speech-Language Pathology Programs

Graduates of speech-language pathology and audiology programs must possess the essential knowledge and skills to function in a broad variety of clinical situations and to render a wide spectrum of patient care safely and effectively. Rush University has specified the following nonacademic criteria ("technical standards") that applicants and enrolled students must meet to participate in the education program and the practice of speech-language pathology and audiology.

1. Observation

- The student must participate actively in all demonstrations and laboratory exercises in the academic and clinical curricula.
- The student must assess and comprehend the condition of all patients assigned to him or her for examination, diagnosis and treatment.
- Such observation and information acquisition usually requires the functional use of visual, auditory, and somatic sensation.

2. Communication

- The student must be able to communicate effectively and sensitively with patients in order to elicit information, describe changes in mood, activity and posture, and assess nonverbal communications.
- The student must be able to effectively and efficiently transmit information to patients, fellow students, faculty, staff, family, and other professionals.
- Required communication skills include speaking, reading, and writing, as well as the observation skills described above.

3. Motor

- The student must have sufficient motor function to elicit information from patients.
- Students must be capable of performing basic diagnostic tests, possess all skills necessary to carry out diagnostic procedures, and execute the movements reasonably required to provide care to patients.

4. Intellectual-Conceptual, Integrative and Quantitative Abilities

- The student must be able to measure, calculate, reason, analyze, synthesize, and apply the critical thinking skills required of a health care professional.
- The student must have the capacity to problem-solve in a timely fashion.

5. Behavioral and Social Attributes

- The student must be able to fully utilize his or her intellectual abilities and exercise good judgment. Prompt completion of all responsibilities attendant to the diagnosis and care of patients is required.
- Students must be capable of developing mature, sensitive, and effective relationships with patients and others.
- Students must be able to tolerate taxing workloads, function effectively under stress, adapt to changing environments, display flexibility, and learn to function in the face of uncertainties inherent in the clinical problems of many patients.
- Compassion, integrity, concern for others, commitment, and motivation are personal qualities that each student should possess.
- The student must show respect for individuals with disabilities and for persons of different ages, ethnic backgrounds, races, religions, and/or sexual orientations.

Communication Disorders and Sciences: Academic Policies

The Academic Resources and Policies section of this catalog contains Rush University academic policies.

The following probation information is governed by the Academic Progression committee.

Academic Probation

Academic probation is assigned to a student who earns a quarterly academic grade point average (GPA) between 2.5 and 2.99 (A = 4.0), and/or whose cumulative academic GPA falls between 2.5 and 2.99 at any time. A remediation plan to address probation will be determined by the student and the student's academic advisor and documented. A student must earn a quarterly and cumulative academic GPA of 3.0 or greater at the end of the quarter during which the student is on academic probation or be placed again on academic probation. A student who incurs academic probation for the third time will be dismissed from the program, even if the cumulative academic GPA is 3.0 or greater.

A student who earns a grade of "D" or less in a required course must repeat that course or an approved equivalent. In a repeated course, the new grade will replace the earlier grade in the cumulative academic GPA. Failure to receive a grade of "C" or better in a repeated course will result in dismissal from the program. A student who earns a grade of "D" or less in two or more required courses, regardless of the grade earned in a repeated course and regardless of the cumulative academic GPA, will be dismissed from the program.

A student who earns a quarterly academic GPA of less than 2.5 at any point during his or her course of study will be dismissed from the program.

A student who fails to meet the stated criteria for the comprehensive examination will be dismissed from the program.

A cumulative academic GPA of 3.0 or greater is required for graduation.

Clinical Probation

Clinical probation is assigned to a student who earns a grade of "C" or less in a clinical practicum, internship, or externship. Although the clinical contact hours may be used to meet CFCC (ASHA) certification requirements, the student is required to repeat the clinical education course before progressing further in the clinical sequence. A remediation plan to address clinical probation will be determined by the student, the student's academic advisor, and the clinical education manager and will be documented. Failure to achieve a grade of "B" or higher in any subsequent clinical education course will result in dismissal from the program.

The faculty reserves the right to request the withdrawal of any student whose conduct or performance demonstrates lack of fitness for continuance in a health profession. Any such student not voluntarily withdrawing will be dismissed from the program.

Interrupted Program

Any student who wishes or needs to interrupt his or her program must fulfill the following requirements:

Meet with his or her academic advisor and the program director to work out a plan of action before leaving the program.

Complete all degree requirements within four years (master's program) and eight years (doctoral program) of the beginning of the first quarter in which the full-time student is enrolled in the department.

Follow all appropriate leave of absence/withdrawal procedures and policies as defined by Rush University.

Academic Appeal and Grievance

See the Communication Disorders and Sciences Student Manual for the policy on academic appeal and grievance and for other policies. The department follows procedures outlined in the College of Health Sciences Student Academic Appeal and Grievance Procedures. Students who wish to file a complaint related to compliance with an accreditation standard may contact the Council on Academic Accreditation at: Chair, Council on Academic Accreditation in Audiology and Speech-Language Pathology, American Speech-Language-Hearing Association, 2200 Research Blvd., Suite 310, Rockville, MD 20850 (800-498-2071 or 301-296-5700).

Communication Disorders and Sciences: Speech-Language Pathology Curriculum

Thesis Track

Thesis students may de-select up to 8 credit hours of select coursework, shown in italics below. De-selected courses may be audited; audited courses will appear on the student's transcript. The selection of the courses to remove from a student's program of study is done with the approval of the student's advisor, taking into account the individual's undergraduate background and graduate needs and experiences.

Enrollment in practicum may be reduced in the winter and spring terms of the second year. These practicum experiences will be scheduled either on campus or at select external sites to facilitate completion of the thesis. The decision to reduce time in practicum for one or both quarters is made in consultation with a student's advisor and the clinical education manager. Students who reduce their practicum hours must be in frequent contact with the clinical education manager throughout their academic programs to monitor that the requisite contact hours needed for graduation are being attained.

Students who do not obtain the needed contact hours will register for additional credit during the following summer quarter so that this graduation requirement will be met. Thesis students who have completed the requisite clock hours and have achieved the skills outcomes for ASHA certification prior to the completion of their theses may be excused from further practicum or have their practicum hours reduced further at the time these requirements are met.

Speech-Language Pathology Curriculum: Thesis Track

Year 1		Credit Hours
Fall Quarter		
CDS-504	Speech Production and Speech Perception	4
CDS-505	Clinical Methods in Speech-Language Pathology I	2
CDS-507	Neurological Bases of Speech, Hearing and Language	4
CDS-537	Anatomy and Physiology of the Speech System	2
CDS-526	Speech Sound Disorders	4
CDS-591	Applied Topics in Communication Disorders and Sciences	1
Winter Quarter		
CDS-506	Clinical Methods in Speech-Language Pathology II	2
CDS-511P	Speech-Language Pathology Practicum I	2–3
CDS-558	Dysphagia	4
CDS-564	Aphasia	4
CDS-581	Research Methods in Communication Disorders	4
Spring Quarter		
CDS-512P	Speech-Language Pathology Practicum II	2–3
CDS-521	Language Disorders in Preschool Children	4
CDS-540	<i>Speech Pathology Management of the Head and Neck Cancer Patient</i>	2
CDS-563	Voice Disorders	4
CDS-567	Dysarthria	4
Summer Quarter		
CDS 503	<i>Hearing Screening and Service Delivery for Speech-Language Pathologists</i>	2
CDS-513P	Speech-Language Pathology Practicum III	6
CDS-528	Current Issues in AAC Service Delivery	1
CDS-542	<i>Speech Pathology Management of Tracheostomized and Ventilator Dependent Patients</i>	2
CDS-562	<i>Craniofacial Anomalies</i>	2
CDS-900	Independent Study	2
Year 2		
Fall Quarter		
CDS-514P	Speech-Language Pathology Practicum IV	4
CDS-522	Language Disorders in School-age Children	4
CDS 535	<i>Current Issues in Cultural and Linguistic Diversity</i>	2
CDS-568	Cognition and Communicative Disorders	4
IDS-510	<i>Health Care in America</i>	2
CDS-598	Thesis	2
Winter Quarter		
CDS-510	<i>Professional Issues in Speech-Language Pathology</i>	2
CDS-524	<i>Fluency, Dysfluency and Stuttering</i>	2
CDS-575	Issues in Counseling	2
CDS-589P	Advanced Practicum I	9
CDS-591	Applied Topics in Communication Sciences and Disorders	1
CDS-598	Thesis	2
IDS-515	<i>Geriatric Interdisciplinary Team Training (Optional)</i>	Au
Spring Quarter		
CDS-590P	Advanced Practicum II	12
CDS-598	Thesis	2
Hours Required for MS Degree:		107

Speech-Language Pathology Curriculum: Non-Thesis Track

Year 1		Credit Hours
Fall Quarter		
CDS-504	Speech Production and Speech Perception	4
CDS-505	Clinical Methods in Speech-Language Pathology I	2
CDS-507	Neurological Bases of Speech, Hearing and Language	4
CDS-537	Anatomy and Physiology of the Speech System	2
CDS-526	Speech Sound Disorders	4
CDS-591	Applied Topics in Communication Disorders and Sciences	1
Winter Quarter		
CDS-506	Clinical Methods in Speech-Language Pathology II	2
CDS-511P	Speech-Language Pathology Practicum I	2–3
CDS-558	Dysphagia	4
CDS-564	Aphasia	4
CDS-581	Research Methods in Communication Disorders	4
Spring Quarter		
CDS-512P	Speech-Language Pathology Practicum II	2–3
CDS-521	Language Disorders in Preschool Children	4
CDS-540	Speech Pathology Management of the Head and Neck Cancer Patient	2
CDS-563	Voice Disorders	4
CDS-567	Dysarthria	4
Summer Quarter		
CDS 503	Hearing Screening and Service Delivery for Speech-Language Pathologists	2
CDS-513	Speech-Language Pathology Practicum III	4
CDS-528	Current Issues in AAC Service Delivery	1
CDS-542	Speech Pathology Management of Tracheostomized and Ventilator Dependent Patients	2
CDS-562	Craniofacial Anomalies	2
Year 2		
Fall Quarter		
CDS-514P	Speech-Language Pathology Practicum IV	4
CDS-522	Language Disorders in School-age Children	4
CDS 535	Current Issues in Cultural and Linguistic Diversity	2
CDS-568	Cognition and Communicative Disorders	4
IDS-510	Health Care in America	2
Winter Quarter		
CDS-510	Professional Issues in Speech-Language Pathology	2
CDS-524	Fluency, Dysfluency and Stuttering	2
CDS-575	Issues in Counseling	2
CDS-589P	Advanced Practicum I	9
CDS-591	CDS Applied Topics in Communication Sciences and Disorders	1
IDS-515	Geriatric Interdisciplinary Team Training (Optional)	Au
Spring Quarter		
CDS-590P	Advanced Practicum II	15
Hours Required for MS Degree:		108

Communication Disorders and Sciences: Audiology Curriculum

Audiology students who begin their studies in fall 2015 will follow the Track FQ15 curriculum.

Audiology students who begin their studies on or after fall 2012 through 2014 will follow the Track I or Track II curricula.

Track I Curriculum

Year 1		Credit Hours
Fall Quarter		
CDS-507	Neurological Bases of Speech, Hearing and Language	4
CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-601	Anatomy and Physiology of the Auditory System	4
CDS-601L	Anatomy and Physiology of the Auditory System Laboratory	1
CDS-603	Acoustics and Psychoacoustics	4
Winter Quarter		
CDS-581	Research Methods in Communication Disorders	4
CDS-604	Acoustic Phonetics and Speech Perception	2
CDS-609	Clinical Observation in Audiology	1
CDS-628	Audiologic Assessment	4
CDS-629	Clinical Methods in Audiology	2
Spring Quarter		
CDS-605	Embryology and Genetics of the Auditory System	2
CDS-616	Audiology Practicum I	1
CDS-631	Basic Amplification	3
CDS-646	Vestibular Assessment and Rehabilitation	4
CDS-646L	Vestibular Assessment and Rehabilitation Laboratory	1
HHV-504	Ethics in Health Care: Interdisciplinary Perspectives	2
Summer Quarter		
CDS-617	Audiology Practicum II	3
CDS-627	Pathophysiology of the Auditory System	3
CDS-644	Pediatric Audiology	3
Year 2		
Fall Quarter		
CDS-591	Applied Topics in Communication Disorders and Sciences I	1
CDS-618	Audiology Practicum III	3
CDS-635	Auditory Implants	3
CDS-643	Electrophysiologic Assessment of Auditory System	4
CHS-501	Introduction to Biostatistics for the Health Scientist	3
Winter Quarter		
CDS-575	Issues in Counseling	2
CDS-619	Audiology Practicum IV	3
CDS-633	Adult and Geriatric Rehabilitative Audiology	4
CDS-608	Pharmacology	3
CDS-648	Advanced Electrophysiologic Assessment	4

(continued)

Track I Curriculum (continued)

Spring Quarter		
CDS-632	Adult Amplification	5
CDS-636	Educational Audiology	3
CDS-676	Vestibular II	2
CDS-816	Internship I	4
CHS 501	Health Care In America	2
Summer Quarter		
CDS-610	Seminar in Career Topics	2
CDS-634	Pediatric Hearing Aids and Habilitation	3
CDS-638	Auditory Processing	2
CDS-680	Investigative Project Planning Seminar	1
CDS-817	Internship II	4
Year 3		
Fall Quarter		
CDS-612	Clinical Operations and Practice Management	3
CDS-626	Hearing Conservation	3
CDS-818	Internship III	4
Winter Quarter		
CDS-661	Advanced Topics in Amplification	1
CDS-681	Investigative Project	2
CDS-819	Internship IV	5
Spring Quarter		
CDS-662	Supervision and Mentorship in Audiology	2
CDS-681	Investigative Project	2
CDS-820	Internship V	5
Summer Quarter		
CDS-891	Externship I	8
Year 4		
Fall Quarter		
CDS-892	Externship II	8
Winter Quarter		
CDS-893	Externship III	8
Spring Quarter		
CDS-894	Externship IV	8
Hours Required for AuD Degree:		166

Track II Curriculum

Year 1		Credit Hours
Fall Quarter		
CDS-507	Neurological Bases of Speech, Hearing and Language	4
CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-601	Anatomy and Physiology of the Auditory System	4
CDS-601L	Anatomy and Physiology of the Auditory System Laboratory	1
CDS-603	Acoustics and Psychoacoustics	4
Winter Quarter		
CDS-581	Research Methods in Communication Disorders	4
CDS-604	Acoustic Phonetics and Speech Perception	2
CDS-609	Clinical Observation in Audiology	1
CDS-628	Audiologic Assessment	4
CDS-629	Clinical Methods in Audiology	2
Spring Quarter		
CDS-605	Embryology and Genetics of the Auditory System	2
CDS-616	Audiology Practicum I	1
CDS-631	Basic Amplification	3
CDS-646	Vestibular Assessment and Rehabilitation	4
CDS-646L	Vestibular Assessment and Rehabilitation Laboratory	1
CHS 510	Health Care in America	2
Summer Quarter		
CDS-617	Audiology Practicum II	3
CDS-627	Pathophysiology of the Auditory System	3
CDS-644	Pediatric Audiology	3
Year 2		
Fall Quarter		
CDS-591	Applied Topics in Communication Disorders and Sciences I	1
CDS-618	Audiology Practicum III	3
CDS-635	Auditory Implants	3
CDS-643	Electrophysiologic Assessment of Auditory System	4
CDS-626	Hearing Conservation	3
Winter Quarter		
CDS-575	Issues in Counseling	2
CDS-608	Pharmacology	3
CDS-619	Audiology Practicum IV	3
CDS-633	Adult and Geriatric Rehabilitative Audiology	4
CDS-648	Advanced Electrophysiology	4
Spring Quarter		
CDS-632	Adult Amplification	5
CDS-636	Educational Audiology	3
CDS-676	Vestibular II	2
CDS-816	Internship I	4
HHV-504	Ethics in Health Care: Interdisciplinary Perspectives	2

(continued)

Track II Curriculum (continued)

Summer Quarter		
CDS-610	Seminar in Career Topics	2
CDS-634	Pediatric Hearing Aids and Habilitation	3
CDS-638	Auditory Processing	2
CDS-680	Investigative Project Planning Seminar	1
CDS-817	Internship II	4
Year 3		
Fall Quarter		
CDS-612	Clinical Operations and Practice Management	3
CDS-818	Internship III	4
CHS-501	Introduction to Biostatistics for the Health Scientist	3
Winter Quarter		
CDS-661	Advanced Topics in Amplification	1
CDS-681	Investigative Project	2
CDS-819	Internship IV	5
Spring Quarter		
CDS-662	Seminar in Supervision and Mentorship	2
CDS-681	Investigative Project	2
CDS-820	Internship V	5
Summer Quarter		
CDS-891	Externship I	8
Year 4		
Fall Quarter		
CDS-892	Externship II	8
Winter Quarter		
CDS-893	Externship III	8
Spring Quarter		
CDS-894	Externship IV	8
Hours Required for AuD Degree:		166

Track FQ15 Curriculum

Year 1		Credit Hours
Fall Quarter		
CDS-507	Neurological Bases of Speech, Hearing and Language	4
CDS-601	Anatomy and Physiology of the Auditory System	4
CDS-601L	Anatomy and Physiology of the Auditory System Laboratory	1
CDS-603	Acoustics and Psychoacoustics	4
Winter Quarter		
CDS-581	Research Methods in Communication Disorders	4
CDS-604	Acoustic Phonetics and Speech Perception	2
CDS-609	Clinical Observation in Audiology	1
CDS-628	Audiologic Assessment	4
CDS-629	Clinical Methods in Audiology	2
Spring Quarter		
CDS-605	Embryology and Genetics of the Auditory System	2
CDS-616	Audiology Practicum I	1
CDS-631	Basic Amplification	3
CDS-646	Vestibular Assessment and Rehabilitation	4
CDS-646L	Vestibular Assessment and Rehabilitation Laboratory	1
CHS-510	Health Care in America	2
Summer Quarter		
CDS-617	Audiology Practicum II	3
CDS-627	Pathophysiology of the Auditory System	3
CDS-657	Seminar in Teleaudiology	1
CDS-644	Pediatric Audiology	3
Year 2		
Fall Quarter		
CDS-591	Applied Topics in Communication Disorders and Sciences I	1
CDS-618	Audiology Practicum III	3
CDS-635	Auditory Implants	3
CDS-643	Electrophysiologic Assessment of Auditory System	4
CDS-626	Hearing Conservation	3
Winter Quarter		
CDS-575	Issues in Counseling	2
CDS-608	Pharmacology	3
CDS-619	Audiology Practicum IV	3
CDS-633	Adult and Geriatric Rehabilitative Audiology	4
CDS-648	Advanced Electrophysiology	2
Spring Quarter		
CDS-632	Adult Amplification	5
CDS-636	Educational Audiology	3
CDS-676	Vestibular II	2
CDS-816	Internship I	4
HHV-504	Ethics in Health Care: Interdisciplinary Perspectives	2

(continued)

Track FQ15 Curriculum (continued)

Summer Quarter		
CDS-610	Seminar in Current Professional Issues	2
CDS-634	Pediatric Hearing Aids and Habilitation	3
CDS-638	Auditory Processing	2
CDS-680	Investigative Project Planning Seminar	1
CDS-817	Internship II	4
Year 3		
Fall Quarter		
CDS-612	Practice Management Across Settings	3
CDS-818	Internship III	4
CHS-501	Introduction to Biostatistics for the Health Scientist	3
CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-658	Seminar in Tinnitus Assessment and Management	1
Winter Quarter		
CDS-661	Advanced Topics in Amplification	1
CDS-681	Investigative Project	2
CDS-819	Internship IV	5
Spring Quarter		
CDS-662	Seminar in Supervision and Mentorship	2
CDS-681	Investigative Project	2
CDS-820	Internship V	5
Summer Quarter		
CDS-891	Externship I	8
Year 4		
Fall Quarter		
CDS-892	Externship II	8
Winter Quarter		
CDS-893	Externship III	8
Spring Quarter		
CDS-894	Externship IV	8
Hours Required for AuD Degree:		166

Clinical Education Experiences in Audiology and Speech-Language Pathology

Clinical training occurs throughout the curriculum, including both patient experiences and clinical methods coursework. Enrollment in each quarter of practicum, internship, or externship is contingent upon satisfactory completion (grade "B" or better) of the previous quarter's clinical education course. Clinical experiences include direct and indirect patient care activities across the scope of practice with diverse populations from all age groups at both on- and off-campus facilities.

Graduation Requirements

The requirements for the Master of Science degree in speech-language pathology and the Doctor of Audiology degree include a cumulative academic GPA of 3.0 or greater and successful completion of the comprehensive examination. Audiology students also must complete their Investigative Project. Thesis students must successfully complete the thesis process in lieu of passing a comprehensive examination.

All master's degree requirements must be completed within 48 months from the beginning of the first quarter in which a full-time student is enrolled in the program. Requirements for the doctoral degree must be completed within eight years of the beginning of the first quarter in which a full-time student is enrolled. Students must complete the number of quarter hours required by the program. Refer to the Department of Communication Disorders and Sciences Student Manual for additional discussion about graduation and degree progression.

Educational Activities

The Department of Communication Disorders and Sciences provides professional education and training in speech-language pathology and audiology. Its programs are notable in that the education of speech-language pathologists and audiologists is enhanced by the opportunities, resources, and facilities provided by a world-class academic medical center. In addition to didactic and clinical activities, students and faculty participate in journal clubs, rounds, and student/faculty development sessions. Students and faculty benefit from presentations by distinguished guests who share research and clinical expertise in audiology or speech-language pathology. Special seminars and presentations on various health care topics are available to students throughout Rush University Medical Center. Faculty members are involved in the education of residents and students in Rush Medical College. Faculty members participate in grand rounds

for various medical specialties and provide in-service programs on campus for staff at Rush University Medical Center and at the Johnston R. Bowman Health Center.

Research Activities

Faculty members are involved in interprofessional and translational research in the areas of audiology, hearing science and speech-language pathology. Projects include cochlear implant processing, working memory and communication, adult speech disorders, dysphagia, neurogenic communication disorders, language and literacy in children, quality of life and hearing aids, aging and hearing loss and many other topics related to human communication. Faculty members publish in professional journals and present at international, national and state meetings. Summaries of faculty research and professional activities are available online at the department's website. Students are encouraged to participate in the research process, including development of hypotheses, data collection, and presentation or publication of results.

Thesis

The faculty's commitment to research and the belief that an appreciation of scientific endeavors is critical to the clinical process provide the basis for an optional thesis. Many students in graduate school choose to do a thesis, thereby gaining valuable research experience. A thesis project is databased and may be an original or replication study. Often students present the results of their research at a professional meeting or publish results in a professional journal. The thesis project is optional in the speech-language pathology curriculum, and students are encouraged to consider choosing this option. Audiology students have the opportunity to complete a thesis in lieu of the Investigative Project. The complete thesis policy is found in the Student Manual for the Department of Communication Disorders and Sciences.

Investigative Project

Students enrolled in the Doctor of Audiology program complete the Investigative Project during the third year of the curriculum. The objectives of the Investigative Project are to synthesize a body of literature related to a specific topic in audiology, to cultivate professional writing skills, to acquire didactic skills for dissemination of professional information and to develop organizational and verbal tools needed for professional presentations. Ordinarily, the investigative project includes three options: 1) Evidence-based Practice Systematic Review; 2) Experimental Project; or 3) Professional/Clinical Project. A complete

description of the Investigative Project is found in the Student Manual for the Department of Communication Disorders and Sciences. Students are expected to submit the completed project for presentation at a state or national professional meeting or for publication.

Service Activities

The faculty provides a full range of diagnostic and therapeutic services to a large clinical population, both inpatients and outpatients. In addition, faculty and students participate in community and professional activities on the local, national, and international level. Students and faculty participate in health fairs, screenings, and other service activities throughout the year. Faculty provide leadership, editorial, and committee service to state and national scientific and professional associations.

Bachelor of Science in Health Sciences: Mission

The mission of the College of Health Sciences is to advance the quality and availability of health care through excellence in education, research and scholarship, service and patient care. The college promotes the values of diversity, access and inclusion in all of its endeavors. The mission of the Bachelor of Science in Health Sciences program is to prepare individuals to enter health professional careers by providing undergraduate courses designed and specifically related to knowledge needed to meet the entry requirements and to provide a thorough health science knowledge base for the advanced courses taken once a professional program is chosen.

Bachelor of Science in Health Sciences: Program Overview

The Program

The Bachelor of Science (BS) in Health Sciences program at Rush University is designed to better prepare students for competitive applications into graduate professional degree programs in a variety of health care professional areas.

The program's curriculum prepares students to enter health science professional degree programs which require or suggest a bachelor's degree as a prerequisite for admission. These programs include, but are not limited to, graduate degree-granting allied health programs (e.g., audiology, physician assistant, respiratory care, occupational therapy, physical therapy, perfusion technology, medical laboratory science), graduate

degree-granting nursing programs (e.g., graduate entry level nursing), medical school and graduate programs in the biomedical sciences (e.g., cellular biology, physiology, pharmacology).

Students will complete a medical science-based curriculum to prepare for graduate school, as well as be given the opportunity to focus on health care leadership skills and/or the area of health-wellness/community health. Graduates of associate degree health occupations programs may use this program to acquire leadership skills needed in their occupational area.

Students may also choose to focus on health-wellness, corporate health, community health and medical home care coordination.

The overall purpose of the program is to provide a high-quality education that is relevant and professionally sound to meet the needs of the health care community.

Program Goals

1. To prepare students for admission to graduate professional degree programs in allied health, medicine, nursing and the biomedical sciences.
2. To provide graduates of associate degree health occupations programs the opportunity to obtain a Bachelor of Science degree to expand their academic preparation and acquire leadership competencies.
3. To provide the opportunity for students to acquire specific competencies in the area of health-wellness and community health.

Program and Students Outcomes:

Major concept areas:

1. Health Science
2. Communications
3. Ethical Issues
4. Critical Thinking
5. Management
6. Information Technology
7. Research

General Program outcomes:

1. Students will gain an understanding of fundamental biological, chemical, and physical properties underlying all life systems.
2. Students will gain a broad understanding of the various health care professions and prepare for entry into a profession of choice.

3. Students will explain how current knowledge, theory, and research are integrated into health professions practice.
4. Students will integrate communication skills to work effectively in health care teams toward accomplishing goals.
5. Students will acquire knowledge of the various health professions and will maintain best practices through continuing education and lifelong learning.
6. Students will practice the ethics and professional behaviors and incorporate these practices into their interactions with one another as colleagues and with the general public.
7. Students will incorporate information technology skills in a variety of health care professions and settings.
8. Students will engage in critical thinking, reflection, and problem solving through evidence-based practice in multiple health care areas.
9. Students will analyze concerns with health care delivery and strategize ideas that can improve disease treatment and prevention.
10. Students will consider the factors that influence community and individual behaviors toward health care to improve care for those in need.
11. Students will appreciate and advocate for continuous improvement of the health care system through promoting public policy.
12. Students will demonstrate respect and adaptability for cultural, ethnic, and individual diversity within a changing health care environment.

Content/discipline knowledge and skills for outcomes 1, 2, 5, 8 and 9 are assessed through assignments, examinations, and other projects completed in the following courses: HSC 301, 302, 304, 305, 311, 312, 321, 322, 331, 333, 402, 404, 411, 412, 413, and electives HSC 430, 431, 432, 433, 434, and NTR 313, 323, 331, 333, 340, 401, 402, 403, 411, 412, 413, 415, 422.

Communication Knowledge and Skills for outcomes 4 and 12 are assessed through assignments, examinations, and other projects completed in the following courses: HSC 301, 303, 412, 450, 451, 453, 455, 470, 471, 472, 473, and electives NTR 323, 422.

Ethical and Diversity Issues and Concepts for outcomes 6, 9, 10, 11 and 12 are assessed through assignments, examinations, and other projects completed in the following courses: HSC 301, 313, 314, 323, 450, 453, 455, 472, 473, 474, 477, and electives NTR 323, 333, 422.

Critical Thinking Skills for outcomes 3, 5, 8 and 9 are assessed as part of the General Education Program through papers, exams, and projects completed in the following courses: HSC 313, 314, 323, 401, 421, 422, 450, 451, 452, 453, 454, 455, 456, 470, 471, 472, 473, 474, 476, 477, and electives HSC 430 and NTR 313, 323, 340, 401, 402, 403, 415, 422.

Information Technology and Skills for outcome 7 are assessed through assignments, examinations, and other projects completed in the following courses: HSC 403, 450, 455, 456, 472, 473, and NTR 340, 415.

Knowledge of Research Methods and Skills for outcome 3 are assessed through assignments, examinations, and other projects completed in the following courses: HSC 324, 332, 421, 422, and NTR 313.

Students are assigned a faculty advisor upon confirmation of admission to the program. The role of the faculty advisor is to serve as a role model, mentor and resource and will act in the best interest of the student. The advisor serves as a direct link between the student and the College of Health Sciences and Rush University administration.

College oversight of the program will assure that the design, conduct, and evaluation of the program is under the direct academic control of the institution. This will include supervision of the processes for student recruitment, admissions, student services, instruction, evaluation and student records.

Clinical

Students will complete practicum experiences of their choice (as available) in a health profession for which they plan to enter graduate school to complete. Offerings may include nursing, medicine, and various allied health fields. Students will shadow the health care providers as they conduct their day-to-day work.

Bachelor of Health Sciences: Admission Requirements

Program entry requirements include satisfactory completion of two years of specified lower division course work at a regionally accredited college or university. Upper division course work for the Bachelor of Science degree in Health Sciences may be completed in as few as 21 months, full time. Students can elect a part-time option.

Admission to the program is on a competitive basis. Student selection will be based on a number of factors including overall grade point average, prerequisite grade point average, consistency of academic performance, course work completed prior to application, and communication abilities.

Requirements for admission to the professional phase of the program include:

1. A minimum of 60 semester credit hours (90 quarter hours) of lower division undergraduate coursework from a regionally accredited U.S. institution
2. A minimum overall GPA of 2.75/4.00 in undergraduate course work
3. Completion of all professional prerequisite required courses with a grade of "C" or better
4. Official transcripts from all colleges attended
5. A personal interview with program faculty
6. Three letters of recommendation
7. Completed application to the program and submission of official transcripts for all college course work completed
8. All applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language examination (TOEFL). A waiver of this requirement may be requested if the individual has graduated from high school or successfully completed a higher education degree program (associate degree or higher) in the United States or one of its English-speaking protectorates.

Courses Required for Admission:*

For admission to the BS in Health Sciences program, students are required to complete, at minimum, the core general education requirements detailed below. In preparation for graduate school, hours may vary based on graduate program for which the student is preparing. For specific courses, see core requirements and general education.

A minimum of 60 semester credit hours (90 quarter hours) of lower division undergraduate coursework from a regionally accredited U.S. institution is required prior to admission to the BS in Health Sciences program. Prerequisite courses must include the general and biological sciences, mathematics, communications, the social sciences and humanities. Specific prerequisite courses may vary depending on the unique prerequisite requirements of the graduate level health professional program of interest to the student. For example, the prerequisite lower division course work required for medical school, though similar, may not be the same as that required for application to graduate school in the area of occupational therapy. Specific prerequisite courses are described below.

1. Chemistry (8-20 semester hours)
2. Biology (16-20 semester hours)
3. Physics (4-8 semester hours)**
4. Mathematics and Statistics (6-12 semester hours)
5. Communications (6 semester hours)
6. Social Sciences (6 semester hours)***
7. Humanities and Fine Arts (6 semester hours minimum)
8. Electives (3-9 semester hours)

* Students wishing to enter medicine or the graduate biomedical sciences are required to have 16 semester credits (SC) of chemistry, 20 SC of biology, 8 SC of physics and 6 SH of mathematics (e.g., calculus I and II). Nursing and specific allied health fields may require only 8 SC of chemistry, 16 SC of biology, 4 SC of physics and 3 SC of mathematics. Clinical Nutrition requires 8 SC of general chemistry, 4 SC of organic chemistry, 3 SC of microeconomics, 3 SC of accounting, 3 SC and 4 SC food preparation with laboratory.

**The master's degree programs in medical laboratory science and nursing at Rush University do not require physics.

*** Students wishing to enter occupational therapy are required to have one course in sociology, or anthropology plus a course in developmental psychology that covers birth through death lifespan. A combination of child psychology plus a course in adult aging meets this requirement.

Application for Admission

Application for admission into the Bachelor of Science in Health Science program must be made through the Rush University RU Applying site before August 1 for admission into the class entering in September. September is the only admission time for entry into the program. Prospective applicants may submit transcripts and a request for an unofficial evaluation to the College of Health Sciences, 600 South Paulina Street, Suite 1001, Chicago, Illinois 60612. Phone number: (312) 942-7120.

Transfer of Credit:

Students who desire to complete additional elective courses, offered either at Rush University or at another regionally accredited college or university, may request to do so, and these electives may be incorporated into the student's program plan with the approval of the student's academic advisor.

Students entering the BS in Health Sciences degree program will complete a minimum of 60 semester hours (90 quarter hours) of prerequisite course work prior to entry into the program. General Education requirements are as follows:

Minimum Core General Education Requirements:

All entering students must complete the following core general education requirements in order to be eligible for the Bachelor of Science degree awarded by Rush University.

Requirements	Semester Hours	Quarter Hours
Two courses in communications (English composition) Composition is required	6	9
One course in mathematics (college algebra or higher)	3	4
Two courses in life sciences (anatomy, biology, microbiology, pathophysiology, physiology)	6	9
One course in physical sciences (chemistry, physics)	3	4
One course in social sciences (government, history, political science, psychology, sociology)	3	4
One course in humanities (ethics, fine arts, literature, philosophy) Performance courses do not meet this requirement	3	4
Elective courses in communications, computer science, ethics, fine arts, humanities, life sciences, literature, philosophy, physical sciences, or social sciences to total 36 semester (56 quarter) hours	36	56
Total Hours of Required and Elective Courses:	60	90

Lower Division Course Work:

Lower division course work must have been completed at a regionally accredited college or university. However, lower division courses will vary depending on the student's graduate school and career goals. Pre-medicine, pre-nursing and pre-allied health professional programs each have unique prerequisite requirements. The following general list encompasses these requirements (variations based on planned graduate school major are noted*).

- Chemistry (8-20 semester hours) Suggested courses:
 - General Chemistry with laboratory (4-8 SC)
 - Organic Chemistry with Laboratory (0-8 SC)
 - Biochemistry with laboratory (0-4 SC)
 - Students may elect 1 semester Organic (4 SC) and 1 semester Biochemistry with laboratory (4 SC).
 - Biochemistry may be taken in year three at Rush if it is not completed as a prerequisite.
- Biology (16-20 semester hours)
 - General Biology with laboratory (4-8 SC)
 - Microbiology with laboratory (4 SC)
 - Anatomy with laboratory (4 SC)
 - Physiology with laboratory (4 SC)
- Physics (4-8 semester hours)**
 - Physics with laboratory (4-8 SC)

- Mathematics and Statistics (6-12 semester hours)
 - College Algebra
 - Calculus I, II
 - Statistics (3 SC)
- Communications (6 SC)
- Social Sciences (6 semester hours)***
 - General Psychology (3 SC)
 - Sociology (0-3 SC)
 - Developmental Psychology (0-3 SC)
- Humanities and Fine Arts (6 semester hours minimum)
- Electives (3-9 semester hours)

* Students wishing to enter medicine or the graduate biomedical sciences are required to have 16 SC of chemistry, 20 SC of biology, 8 SC of physics and 6 SH of mathematics (e.g., calculus I and II). Nursing and specific allied health fields may require only 8 SC of chemistry, 16 SC of biology, 4 SC of physics and 3 SC of mathematics. Clinical Nutrition requires 8 SC of general chemistry, 4 SC of organic chemistry, 3 SC of microeconomics, 3 SC of accounting, 3 SC and 4 SC of food preparation with laboratory.

**The master's degree programs in medical laboratory science and nursing at Rush University do not require physics.

*** Students wishing to enter occupational therapy are required to have one course in sociology, or anthropology plus a course in developmental psychology that covers birth through death lifespan. A combination of child psychology plus a course in adult aging meets this requirement.

Proficiency in English

All applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language examination (TOEFL).

A total TOEFL score of at least 88 on the Internet-based version, or 570 on the paper-based version, or 230 on the computer version must be achieved. In addition, applicants must score no less than 55 on the paper version, or 20 on the computer version, or 18 on the Internet-based version on each of the three subtests of the TOEFL (listening, structure/writing, and reading).

An official report of these scores must be received by the Admissions Office prior to the date(s) on which admission decisions are made for the program(s) to which the applicant has applied. To obtain information or to register to take the TOEFL, write directly to:

The Education Testing Service
P.O. Box 6151
Princeton, New Jersey 08541-6151, U.S.A.

Applicants may also wish to visit the TOEFL website at <http://www.toefl.org>. The applicant should indicate on his or her application for the examination that results should be sent to institution code number 1676.

Applicants whose native language is not English and who have graduated from high school or successfully completed a higher education degree program (associate degree or higher) in the United States or one of its English-speaking protectorates may petition for waiver of the TOEFL requirement to the College of Health Sciences Dean's Office.

Waiver requests should include proof of receipt of a high school or college diploma from an accredited institution in the United States or one of its English-speaking protectorates. College or university degrees must be granted by a regionally accredited college or university to be considered for waiver of the TOEFL.

Essential Functions

The following essential functions are required of all students enrolled in the Bachelor of Science in Health Sciences program:

1. Observation: The students must be able to observe demonstrations and exercises related to their particular health

science discipline including the use of simple and complex instruments.

2. Communication: The student must be able to communicate clearly and sensitively with patients and family members. The student must be able to communicate effectively and efficiently with all members of the health care team.

3. Motor: Students must be able to perform tasks related to their particular health science discipline.

4. Intellectual-Conceptual, Integrative and Quantitative Abilities: These intellectual abilities include measurement calculations, reasoning, analysis and synthesis. Problem solving is a critical skill requiring all of these intellectual abilities.

5. Behavioral and Interpersonal Attributes: Students must possess the emotional health required for full utilization of intellectual abilities. This includes, but is not limited to, the exercise of good judgment and the prompt completion of all responsibilities attendant to the performance of procedures with maximal attention to safety of self and others in dealing with potentially hazardous equipment and materials. Students must be able to tolerate periods of taxing workloads and function effectively under stress and with unpleasant materials. Students must be able to adapt to changing environments, to display flexibility, and to learn to function in the face of uncertainties inherent in the clinical situations. Compassion, integrity, concern for others, interpersonal skills, interest and motivation, as well as the ability to maintain confidentiality of patient results, are all personal qualities that will be assessed during the education process.

6. Academic Performance: The student must obtain information from lectures, laboratory sessions/exercises, audiovisual materials and written materials. Students must take essay and multiple-choice tests, complete papers, deliver presentations and perform required clinical practice procedures.

Each student is expected to perform the above, with or without reasonable accommodation. Reasonable accommodation is defined as any reasonable change in the environment or in the way activities are usually done that enables an individual with a disability to participate as fully as possible in the academic program. Accommodations may include modification of policies, practices and procedures or the provision of auxiliary aids for communication. Students must not pose a threat to the safety or well-being of patients, other students, staff or themselves.

A request for accommodation or modification is not cause for withdrawal of the offer of acceptance. Any student can request accommodations once enrolled in the program. If an accommodation is requested, the department may require additional

documentation and information and will follow up with the student to discuss the specifics of the request and the appropriate plan of action. The program reserves the right to require applicants or students to demonstrate any of these essential functions.

Bachelor of Health Sciences: Academic Policies

Academic Progression

High academic performance in all courses is expected. Students will be considered in good standing at Rush University unless placed on academic probation. A cumulative grade point average of at least 2.5 is required to be considered in good standing, and to be eligible to continue in the baccalaureate program. Cumulative grade point averages will be reviewed after each quarter.

The faculty reserves the right to request the withdrawal of a student whose conduct, health, or performance demonstrates lack of fitness for continuance in a health profession. Any such student not voluntarily withdrawing will be dismissed from the University, regardless of grade point average.

Academic Probation

Academic probation is assigned to any student who receives a quarterly grade point average below 2.5, or whose cumulative grade point average falls below 2.5. Students placed on probation have two quarters in which to regain the status of good standing as follows:

- The next quarter after being placed on probation, the student must attain a quarterly grade point average of at least 2.5.
- Two quarters after being placed on probation, the student must have a cumulative grade point average above 2.5.

Failure to make the minimum quarterly grade point average one quarter after probation regardless of the cumulative grade point average, or failure to make the minimum cumulative grade point average two quarters after probation, will result in dismissal from the University.

“D”, “F” or “N” Grades in the Bachelor of Science Program

Undergraduate students who receive an “F” or “N” grade in any course MUST repeat that course with the “F” or “N” grade being replaced by the grade earned upon repeating the course. In the event that a student is required to repeat a course that is a prerequisite for an advanced course, the advanced course may

not be taken until the student successfully passes the prerequisite course. Thus, the student’s progression in the program may be affected. Students who receive a second “D” or “F” or “N” grade in the same academic year will be dismissed from the program, regardless of cumulative grade point average.

Student Appeals

Please see the College of Health Sciences Student Academic Appeal and Grievance Procedures section of this catalog.

Student Professional and Community Service Requirement

Please see the College of Health Sciences Student Professional and Community Service policy section of this catalog.

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Bachelor of Health Sciences: Curriculum

Upper Division Course Work

Rush University provides two years of upper division course work to complete the requirements for the Bachelor of Science in Health Sciences.

Upper division course work consists of core courses required of all students and elective courses offered within three concentrations:

1. Medical sciences
2. Leadership
3. Health/wellness

Students must complete a minimum of 90 quarter hours (QH) of upper division coursework to include a minimum of 45 QH in the required core and at least 45 QH of required concentration course work, as approved by their academic advisor.

Core Courses Required of All Students

HSC-301	Introduction to the Health Professions	4
HSC-303	Professional Writing	3
HSC-313	Health Care Ethics	3
HSC-314	Health Care in America	3
HSC-323	Health Care Disparities	4
HSC-324	Biostatistics	3
HSC-332	Introduction to Research	5
HSC-333	Epidemiology	4
HSC-403	Health Care Informatics	4
HSC-404	Nutrition	3
HSC-412	Patient Assessment	4
HSC-421	Practicum	5-10
HSC-422	Capstone Project	5
Total Quarter Hours		45-50

Medical Sciences Concentration

HSC-302	Anatomy w/ Laboratory	5
HSC-304	Laboratory Fundamentals or Biochemistry	4
HSC-311	Medical Physiology	5
HSC-312	Clinical Immunology	4
HSC-321	Hematology*	4
HSC-322	Clinical Chemistry	4
HSC-331	Microbiology	5
HSC-401	Mycology, Parasitology, Virology*	4
HSC-402	Genetics	4
HSC-411	Molecular Diagnostics*	4
HSC-413	Pharmacology	4
Total Quarter Hours		47

*Additional electives may be substituted for these courses with approval of the student's advisor.

Leadership Concentration

HSC-450	Management Principles	4
HSC-451	Leadership Theory and Practice	4
HSC-452	Health Care Budgeting and Finance	4
HSC-453	Patient and Practitioner Education	5
HSC-454	Human Resources	4
HSC-455	Quality Improvement	4
HSC-456	Managed Care	4
HSC-457	Issues and Trends in Health Care	5
Electives (must be approved by advisor)		12
Total Quarter Hours		46

Health Wellness Concentration

HSC-450	Management Principles	4
HSC-451	Leadership Theory and Practice	4
HSC-453	Patient and Practitioner Education	5
HSC-470	Principles of Health and Wellness I	4
HSC-471	Principles of Health and Wellness II	4
HSC-472	Corporate Health Programs*	4
HSC-473	Community Health*	4
HSC-474	Medical Home: Principles and Practice*	4
HSC-475	Fitness and Health*	3
HSC-476	Chronic Disease Management	4
Electives		4
Total Quarter Hours		45

*Additional electives may be substituted with approval of the student's academic advisor.

Upper Division Curriculum:

Medical Science Concentration (Subject to change)

Year 1		Credit Hours
Fall Quarter		
HSC-301	Introduction to the Health Professions	4
HSC-303	Professional Writing	3
HSC-311	Medical Physiology	5
HSC-323	Health Care Disparities	4
Subtotal		16
Winter Quarter		
HSC-302	Anatomy w/ Laboratory	5
HSC-312	Clinical Immunology	4
HSC-313	Health Care Ethics	3
HSC-314	Health Care in America	3
Subtotal		15
Spring Quarter		
HSC-304	Laboratory Fundamentals OR	4
HSC-305	Principles of Biochemistry	4
HSC-321	Hematology*	4
HSC-322	Clinical Chemistry	4
HSC-324	Biostatistics	3
Subtotal		15
Summer Quarter		
HSC-331	Microbiology	5
HSC-332	Introduction to Research	5
HSC-333	Epidemiology	4
Subtotal		14
Year 2		Credit Hours
Fall Quarter		
HSC-401	Mycology, Parasitology, Virology*	4
HSC-402	Genetics	4
HSC-403	Health Care Informatics	4
HSC-404	Nutrition	3
Subtotal		15
Winter Quarter		
HSC-411	Molecular Diagnostics*	4
HSC-412	Patient Assessment	4
HSC-413	Pharmacology	4
Subtotal		12
Spring Quarter		
HSC-421	Practicum	5-10
HSC-422	Capstone Project	5
Subtotal		10-15

* Electives may be substituted for some of the courses indicated by an asterisk (*). Elective courses must be approved by the student's academic advisor and the program director and correspond with the student's career goals.

Leadership Concentration (Subject to change)

Year 1		Credit Hours
Fall Quarter		
HSC-301	Introduction to the Health Professions	4
HSC-303	Professional Writing	3
HSC-450	Management Principles	4
HSC-451	Leadership Theory and Practice	4
Subtotal		15
Winter Quarter		
HSC-313	Health Care Ethics	3
HSC-314	Health Care in America	3
HSC-452	Health Care Budgeting and Finance	4
HSC-453	Patient and Practitioner Education	5
Subtotal		15
Spring Quarter		
HSC-323	Health Care Disparities	4
HSC-324	Biostatistics	3
HSC-454	Human Resources	4
HSC-455	Quality Improvement	4
Subtotal		15
Summer Quarter		
HSC-332	Introduction to Research	5
HSC-333	Epidemiology	4
HSC-456	Managed Care Elective	4
Subtotal		17
Year 2		Credit Hours
Fall Quarter		
HSC-403	Health Care Informatics	4
HSC-404	Nutrition	3
HSC-457	Issues and Trends in Health Care Elective	5
Subtotal		16
Winter Quarter		
HSC-411	Molecular Diagnostics*	4
HSC-412	Patient Assessment Elective	4
Subtotal		16
Spring Quarter		
HSC-421	Practicum	5-10
HSC-422	Capstone Project	5
Subtotal		10-15

Electives may be substituted for some of the courses indicated by an asterisk (). Elective courses must be approved by the student's academic advisor and the program director and correspond with the student's career goals.

Health and Wellness Concentration (Subject to change)

Year 1		Credit Hours
Fall Quarter		
HSC-301	Introduction to the Health Professions	4
HSC-303	Professional Writing	3
HSC-450	Management Principles	4
HSC-451	Leadership Theory and Practice	4
Subtotal		15
Winter Quarter		
HSC-313	Health Care Ethics	3
HSC-314	Health Care in America	3
HSC-453	Patient and Practitioner Education	5
HSC-470	Principles of Health and Wellness I	4
Subtotal		15
Spring Quarter		
HSC-323	Health Care Disparities	4
HSC-324	Biostatistics	3
HSC-471	Principles of Health and Wellness II	4
	Elective	4
Subtotal		15
Summer Quarter		
HSC-332	Introduction to Research	5
HSC-333	Epidemiology	4
HSC-472	Corporate Health Programs	4
Subtotal		13
Year 2		Credit Hours
Fall Quarter		
HSC-403	Health Care Informatics	4
HSC-404	Nutrition	3
	Elective	4
Subtotal		15
Winter Quarter		
HSC-412	Patient Assessment	4
HSC-473	Medical Home: Principles and Practice	4
HSC-475	Fitness and Health	3
HSC-476	Chronic Disease Management	5
Subtotal		16
Spring Quarter		
HSC-421	Practicum	5-10
HSC-422	Capstone Project	5
Subtotal		10-15

**Electives may be substituted for some of the courses indicated by an asterisk (*). Elective courses must be approved by the student's academic advisor and the program director and correspond with the student's career goals.*

Transfer of Credit

Students who desire to complete additional elective courses, offered either at Rush University or at another regionally accredited college or university, may request to do so, and these electives may be incorporated into the student's program plan with the approval of the student's academic advisor.

Bachelor of Health Sciences: Graduation Requirements

Degree requirements that must be met include:

Residency Requirement

Residency Requirement

The Bachelor of Science degree in Health Sciences requires a minimum of 180 quarter hours. This includes at least 90 quarter hours earned at a lower division college or university, or at an affiliated college. A minimum of 45 quarter hours of academic credit shall be earned as an upper division student in academic residence at Rush University. Candidates for the Bachelor of Science degree must earn a 2.5 cumulative grade point average in all computed upper division credits taken at Rush University.

PhD in Health Sciences: Program Overview

The Doctor of Philosophy in Health Sciences (PhD) degree program, formally offered through the Graduate College, is designed to prepare health science professionals to assume major leadership, research and educational roles within their professions, as well as to provide career advancement opportunities. This interdisciplinary PhD program of study includes core coursework in education, leadership, management, research and statistics. Advanced coursework in a health science professional track, as well as elective courses in related areas, are included. The completion of a research project culminating in the successful defense of a dissertation is also required.

In addition to core requirements in management, leadership, research and statistics, the Doctor of Philosophy in Health Sciences offers ten specialization tracks. Specialty areas available include Medical Laboratory Science, Speech Pathology, Audiology, Health Systems Management, Nutritional Sciences, Medical Physics, Occupational Therapy, Perfusion Technology, Physician Assistant Studies and Respiratory Care.

Full-time students may complete formal courses by the end of the second year. After passing a comprehensive written examination on fundamental principles related to education,

leadership, management, research and the student's chosen area of concentration, the student must present a dissertation proposal that meets the approval of his or her advisory committee.

For the remainder of graduate training, the degree candidate concentrates on the dissertation research project under the direction of his or her advisor and committee. The research is conducted over a one- to three-year period. The PhD degree, which can usually be earned in four or five years, demonstrates the capability for independent research and recognizes a unique contribution to scientific knowledge.

The program is intended to advance the science and practice of the health care by providing a link between the biomedical sciences, clinical research and practice. By incorporating a required research project, the program will increase knowledge within the discipline, provide for interdisciplinary collaboration, and help train future faculty for the field.

PhD in Health Sciences: Program Goals

1. To prepare students to discover and disseminate new knowledge to provide high-quality, accessible and cost-effective health care and related services in the allied health sciences.
2. To prepare students to conduct outcomes research to improve patient care and inform health policy.
3. To prepare students to develop interprofessional/interdisciplinary collaboration in the design and conduct of research.
4. To prepare students to conduct research that is ethical and responsible.
5. To provide core competencies in the areas of research, education and leadership.
6. To provide advanced, discipline-specific cognate courses to ensure these practitioners are well versed in the latest science related to their specific allied health disciplines.
7. To prepare future faculty and leaders in the allied health sciences to teach, practice and perform research across the continuum of health care.

This program is offered in collaboration with the College of Health Sciences at Rush University, and core faculty hold appointments in both the Graduate College and the College of Health Sciences. The Division of Health Sciences is dedicated to the mission, vision, and values of the Graduate College, the College of Health Sciences, the University and the Medical Center.

PhD in Health Sciences: Career Outlook

PhD in Health Sciences program graduates are prepared to assume roles as academicians, clinical researchers and leaders in allied health. Research skills will be based on the integration of knowledge from the biological, behavioral, educational, management and clinical sciences. Research will contribute to the scientific basis of care provided to patients in order to improve quality, access and cost of health care and related services. Graduates will also have the leadership skills necessary to serve as senior level professionals in their allied health disciplines and influence health care systems and policy.

The overall purpose of the program is to provide an outstanding, high-quality education that is relevant and professionally sound to meet the allied health leadership needs of the health care community. Inherent in this purpose is the goal to prepare future faculty and leaders who are able to discover and disseminate new knowledge in the allied health sciences.

The curriculum is designed to train and educate leaders in the health sciences. The specialty tracks are intended to offer advanced, discipline-specific cognate courses to ensure that these practitioners are well versed in the latest science related to their specific allied health disciplines. The goal is to provide experienced allied health professionals with a broad-based, interdisciplinary education that will prepare graduates to teach, practice and perform research across the continuum of health care.

PhD in Health Sciences: Admission Requirements

Applicants must have completed a Master of Science degree or higher degree from a regionally accredited college or university, provide official transcripts from each college or university attended, and hold appropriate certification/licensure in their individual health science profession by a major U.S. certification/licensing agency, as applicable. Courses taken outside the United States may be considered for transfer with the approval of the Section Director, but all such courses must be evaluated by the Educational Credential Evaluators (ECE) and be judged equivalent by U.S. standards.

In addition, applicants must:

- Possess a minimum overall grade point average (GPA) of 3.0 on a 4.0 scale.
- Submit scores from the Graduate Record Examination (GRE). In order to be considered competitive, the combined Verbal and Quantitative section score should be 1,000 or above.

- Complete all prerequisite courses where required with a grade of 3.0 or better. All prerequisite courses must be completed by the time the student begins the program.
- Provide documentation of specialty certification and licensure.
- Provide three letters of recommendation from persons who are knowledgeable about the quality of the applicant's scholarly activities and/or work experiences.

Acceptable health care experience in the professional area of study is required for admission. Prior research experience, especially in a medical environment, will also be considered and has the benefit of increasing the candidate's understanding of the biomedical research process. Specific admission requirements may be waived by the Graduate College Council. These will be addressed on a case by case basis.

Note: Enrollment is limited. Specialty tracks do not accept students every year. Applicants should contact the PhD Division Director to ascertain if students are being accepted into the specialty track they wish to enroll in:

Dr. Herb Miller, PhD, MLS(ASCP)^{CM}
 Division Director
 (312) 942-7251
 email: herb_j_miller@rush.edu

Admissions Applications

Application for the Rush University PhD in Health Sciences Program must be completed online.

Transfer of Credit:

The PhD program in Health Sciences will consist of four major core areas:

- Education (12 QH)
- Research & Statistics (21 QH)
- Leadership (10 QH)
- Professional Track (16 QH)

In addition, students will be able to take 19 quarter hours of elective and independent study courses. A formal research project culminating in a dissertation constitutes 12 QH of credit. Students holding a master's degree will be able to transfer 30-45 QH into the PhD program.

Additional graduate course work may be accepted subject to the approval of the major advisor and the section director for graduate level courses taken at other institutions if they are judged to meet divisional requirements. Grades from courses transferred from another institution are not recorded on the student's

academic record; the number of credits is recorded and added to the cumulative number of credits.

The minimum number of quarter hours required for the PhD degree in Health Sciences is 120 QH. A minimum of 45 credit hours must be taken at Rush to fulfill residency requirements. Students entering the program at the bachelor's level will be required to complete one of the currently offered Master of Science degree programs in their area of specialty or complete 30-45 QH of acceptable graduate credit.

Please see the Graduate College section of the catalog for program curriculum information.

Health Systems Management: Philosophy, Mission, Vision and Values

Philosophy

The Health Systems Management master's program, which started in 1979, educates students for highly successful careers in the rapidly growing field of health care management. Graduates become hospital and health systems administrators, work as health care consultants, manage physician practices, work in international health care development and manage professional associations. The hallmark of the program is its practitioner-teacher model, where graduate students learn from practitioners and practice what they learn. The program has an outstanding faculty-student ratio, which provides many opportunities for mentoring and professional growth. The program, which is ranked by U.S. News and World Report among the elite top five in the nation and accredited by the Commission on Accreditation of Healthcare Management Education (CAHME), links practitioner-focused coursework with real-world management experience. Students study a comprehensive health management curriculum taught by experienced educators who are also top health care administrators.

Mission

Our mission is to prepare individuals for roles of increasing leadership in the field of health care management, with the ultimate goal of transforming health care organizations to deliver the highest-quality patient care and improve the lives of patients, their families and the community. Our practitioner-teacher model integrates classroom learning with health care management practice, benefiting both students and faculty.

Our curriculum is designed to provide the knowledge, skills, abilities and values required to succeed in the field of health care management. An emphasis on competency and professional skills development — and an orientation toward lifelong

learning — ensures that new graduates are well prepared for early careerist positions and that our alumni hold positions of increasing responsibility during their careers.

Our practitioner-teacher model provides leadership development opportunities for the faculty, ensuring that they stay abreast of the most recent conceptual frameworks and best practices in the field. Their roles as practitioner faculty provide them with opportunities to teach and mentor the next generation of health care leaders.

Vision

Our program will be recognized as one of the premier health administration graduate programs in the nation. Our practitioner-teacher model will be recognized as an ideal way to educate and train health administration graduate students. Through participation in the program's practitioner-teacher model, our faculty will be known for innovation and excellence in health care management practice, education and scholarship.

Values

Our program embraces the values of Rush University Medical Center, Rush University and the College of Health Sciences. These values include innovation, collaboration, accountability, respect, excellence, diversity, inclusion and accommodation.

Health Systems Management: Admission Requirements

Applicants must have a bachelor's degree from an accredited college or university or anticipate completion of that degree prior to the start of the Health Systems Management degree program. The two prerequisite courses, which consist of an undergraduate course in accounting and an undergraduate course in statistics, also must be completed prior to enrollment. An undergraduate course in microeconomics is highly recommended. Applicants fill out an online application, provide three letters of recommendation and submit official copies of their college/university transcripts from every college/university previously attended. In addition, they submit scores from either the Graduate Record Examination (GRE) or the Graduate Management Aptitude Test (GMAT). International students also must submit a credentialing evaluation of their international education as well as the results from the Test of English as a Foreign Language (TOEFL).

Qualified applicants are invited to Rush for an admissions visit. The visit typically includes four faculty interviews, lunch with a current student and an appointment with the Office of Student Financial Aid.

Health Systems Management: Academic Policies

Enrollment

While the program is primarily designed for full-time study, students can enroll in the program on either a full- or part-time basis. Full-time students typically attend the program for six quarters over two academic years, with a summer break. Part-time students typically take two courses per quarter. The program must be completed within a five-year time limit unless the student is granted a waiver by program officials.

Academic Progress

All students in the Department of Health Systems Management must achieve a grade point average of 3.0 (A = 4.0) each quarter to maintain satisfactory academic status. A student is placed on academic probation when his or her grades fall below a quarterly or cumulative GPA average of 3.0 or when a student receives a grade of "F" in any course. A student on academic probation remains on probation until he or she has met the requirements established by the program for removal from academic probation.

Academic Advising

All students are assigned an academic advisor from among the core faculty during orientation week. By the end of the first quarter, students are also assigned a career advisor from among Rush practitioner-teacher faculty.

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Health Systems Management: Curriculum

The curriculum is designed to instruct students in the current theory and practice of health services management, including the study of organizational behavior, quantitative and analytical techniques, planning, finance and human resources management. The curriculum structure gives students the opportunity to apply managerial principles in real-world learning environments and to design and conduct applied health services research projects.

The curriculum content focuses on management and leadership competencies and their application to health services organizations through a study of organizational behavior, quantitative methods, budgeting, finance, information systems, law, strategic

planning, governance, health policy, marketing, health insurance and managed care, health economics, and the social and environmental determinants of health and disease.

HSM Full-Time Program of Study (Students Entering Fall 2015)

Year 1		Credit Hours
Fall Quarter		
HSM-502	Health Care Organization	2
HSM-504A	Professional Seminar I	2
HSM 506	Patient Experience	2
HSM-515	Human Resource Management	4
HSM-531	Health Care Financial Accounting	4
HSM-550A	HSM Internship	1
Winter Quarter		
HSM-504B	Professional Seminar II	2
HSM-557	Quality in Health Care	3
HSM-536	Corporate Finance	4
HSM-533	Health Care Economics	4
HSM-552	Health Care Information Systems	2
HSM-550B	HSM Internship	1
Spring Quarter		
HSM-551	Health Informatics	2
HSM-514	Statistics for Health Care Management	3
HSM-567	Health Insurance and Managed Care	3
HSM-572	Health Care Operations Management	4
HSM-550C	HSM Internship	1
Year total		44-46
Year 2		Credit Hours
Fall Quarter		
HSM-523	Managerial Epidemiology	3
HSM-559	Health Care Planning and Marketing	4
HSM-532	Health Care Managerial Finance	4
HSM-597A	Master's Project I	4
Winter Quarter		
HSM-543	Health Law	3
HSM-545	Organizational Analysis and Change	4
HSM 576	Ethics for Health Care Managers	2
HSM-597B	Master's Project II	4
Spring Quarter		
HSM-560	Health Policy	3
HSM-593	Governance and Leadership	2
HSM-596	HSM Capstone: Strategic Management of Health Care Organizations	4
Year total		41-43
Hours Required for MS Degree:		87

HSM Part-Time Program of Study
 (Students Entering Fall 2015)

Year 1		Credit Hours
Fall Quarter		
HSM-502	Health Care Organization	2
HSM-504A	Professional Seminar I	2
HSM 506	Patient Experience	2
Winter Quarter		
HSM-557	Quality in Health Care	3
HSM-504B	Professional Seminar II	2
HSM-552	Health Care IS	2
Spring Quarter		
HSM-514	Statistics for Healthcare Management	3
HSM-551	Health Informatics	2
Year 2		Credit Hours
Fall Quarter		
HSM-515	Human Resource Management	4
HSM-531	Health Care Financial Accounting	4
Winter Quarter		
HSM-533	Health Care Economics	4
HSM-543	Health Law	3
Spring Quarter		
HSM-567	Health Insurance & Managed Care	3
HSM-572	Health Care Operations Management	4
Year 3		Credit Hours
Fall Quarter		
HSM-559	Healthcare Planning & Marketing	4
HSM-523	Managerial Epidemiology	3
Winter Quarter		
HSM-536	Corporate Finance	4
HSM-545	Organizational Analysis & Change	4
Spring Quarter		
HSM-593	Governance, and Leadership	2
Year 4		Credit Hours
Fall Quarter		
HSM-597A	Masters Project	4
HSM-532	Health Care Managerial Finance	4
Winter Quarter		
HSM-579B	Masters Project II	4
HSM-576	Ethics for Health Care Managers	2
Spring Quarter		
HSM-560	Health Policy	3
HSM-596	Strategic Management of Healthcare Organizations	4

Elective Course Options

The Health Systems Management program (full and part-time) require 3 electives, depending on your status as a student you may be able to enroll in as many two electives during a quarter.

Full-Time students may enroll in one elective in the Year 1 Spring and Year 2 Winter quarters, respectively, and enroll in two electives in the Year 2 Spring quarter.

Part-Time students may enroll in two electives in the Year 3 Spring quarter and enroll in one elective in the Year 4 Winter quarter.

Students have two options to fulfill their three required electives:

A)		Credit Hours
HSM-590	Topics in Health Systems Management (elective)	2
HSM-592	Topics in Health Systems Management II (elective)	2
HSM-594	Topics in Health Systems Management III (elective)	2
B)		Credit Hours
HSM-590	Topics in Health Systems Management (elective)	2
HSM-592	Topics in Health Systems Management II (elective)	2
HSM-597C*	Writing for Publication (elective)	2

For electives listed above only 2 credit hours are required.

*With option B, students can substitute the HSM 594 elective with HSM 597C

Health Systems Management: Graduation Requirements

To be eligible to graduate, a student must successfully complete all the Department of Health Systems Management's academic requirements, which include earning a minimum of 87 quarter hours of credit and achieving a minimum cumulative grade point average of 3.0.

In addition, students must complete a minimum of 440 hours of work in a health care management internship. Most students will complete this by working in a part-time student job during the academic program and registering for HSM-550A, B and C.

Students need to have at least 16 documented contact hours of professional or community service.

Health Systems Management: Faculty Work/Service Activities

Members of the faculty of the Department of Health Systems Management are actively involved in the operation of Rush University Medical Center as hospital administrators and health care planners, university administrators, financial managers, clinicians, attorneys, researchers, and information services managers. They serve as consultants to hospitals, planning bodies and other organizations.

Faculty members hold leadership positions, participate in seminars and engage in other professional activities sponsored by the American College of Healthcare Executives, the American Hospital Association, the Chicago Health Executives Forum, the Healthcare Financial Management Association, the Association of University Programs in Health Administration, the Commission on Accreditation of Healthcare Management Education, the Healthcare Information Management Systems Society and the Illinois Hospital and Health Systems Association.

Health Systems Management: Career Services

Health Systems Management students receive ongoing career mentoring, counseling and related services throughout their academic career. During the first academic year, full-time students are placed in part-time jobs throughout Rush University Medical Center. The job sites include Perioperative Services, Nursing Administration Revenue Management, Human Resources, Finance, Medical Affairs, Enterprise Resource Planning, Capital Projects, Long Term Care, Quality and Accreditation, Women and Children's Services, Patient Relations, Emergency Management, Rush Health, Emergency Department, Health and Aging, Strategic Outreach, Midwest Orthopaedics and Rush University Medical Group. The jobs provide practical experience, reinforce the coursework, produce a more dynamic classroom experience and offer students a multifaceted perspective on the field of health care management. The student's manager also functions as a preceptor for the work experience.

Program faculty and staff provide assistance identifying opportunities for summer internships and part-time work during the second academic year and counseling/assistance to secure postgraduate fellowships or jobs.

While students receive individualized input regarding their career goals, the program's Professional Seminar series provides systematic training, guidance and feedback in professional skills development and career planning.

Health Systems Management: Rush Center for the Advancement of Healthcare Value

The vision of the Rush Center for the Advancement of Healthcare Value is to be recognized globally as an innovator in conducting research that prepares leaders for the future of health care.

Our center is housed within the Department of Health Systems Management at Rush University.

Our center's work is grounded in interdisciplinary research and focuses on translating research into practice and uses practice as a foundation for research. Our research is differentiated by the following:

- Academically based center with close ties to the practice community
- Strong focus on leadership development in health care research and practice
- Pursuit of objective knowledge
- Experts in advanced analytic methods
- Proficiency in large multisource database analyses

Our research focuses on evaluating ways to improve the value of care provided by health care organizations. This work addresses important challenges that relate to:

The patient experience: Studies focusing on identifying evidence-based approaches to improving the patient experience, including patient decision making, facilities and throughput, patient satisfaction and clinical outcomes.

Quality and safety: Studies that focus on testing and evaluating methods and outcomes, ranging from disease surveillance to international patients traveling to the U.S. seeking the highest-quality care.

Efficiency: Studies that are aimed at reducing operational barriers, such as providing clinicians with tools and guidelines to optimize and streamline operations.

For more information about our center, contact Tricia Johnson, PhD, Associate Chair of Research and Education, Associate Professor and Director, at (312) 942-7107 or tricia_j_johnson@rush.edu.

Imaging Sciences Education Program: Philosophy

Mission

The Bachelor of Science in Imaging Sciences degree program is dedicated to the mission of the College of Health Sciences and Rush University.

The department of Medical Physics and Advanced Imaging Sciences is committed to preparing advanced-level imaging science professionals to provide high-quality diagnostic and interventional imaging procedures to patients. The program also seeks to enroll a diverse student body in order to promote the values of diversity and inclusion in all of our educational programs.

Goals

The Department of Medical Physics and Advanced Imaging Sciences is dedicated to clinical and academic excellence in teaching, scholarship, service and patient care. The Imaging Sciences Program is designed to provide students with an outstanding education in preparation for a satisfying professional career as advanced imaging sciences practitioners as well as providing a foundation for leadership in management and supervision, education and clinical specialization.

The overall purpose of the program is to provide a high quality of education that is relevant and professionally sound to meet the advanced imaging needs in the health care community. Inherent in this purpose is the goal to prepare imaging sciences professionals who can demonstrate the knowledge, skills and professional competencies needed to perform advanced-level imaging in Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Cardiac-Interventional (CI), Vascular-Interventional (VI) and other advanced imaging modalities while completing their bachelor's degree.

Imaging Sciences Education Program: Program Overview

About the Profession

Radiologic imaging science, also known as radiologic technology or medical radiography, is the allied health profession responsible for diagnostic and interventional medical radiographic imaging. Imaging sciences professionals, under the supervision of physicians, provide medical imaging services to patients.

The Program

The Rush University Bachelor of Science in Imaging Sciences program offers an opportunity for registered radiologic technologists to advance their education by obtaining a bachelor's degree and skills that are significant to their current profession. This program offers the radiologic technologist an opportunity for advancement in employment and prepares advanced medical imaging technologists for professional leadership roles. This academic degree program will provide graduates with the knowledge, skills and professional competencies needed to perform advanced-level imaging in Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Cardiac-Interventional (CI), Vascular-Interventional (VI) and other advanced imaging modalities.

The Bachelor of Science in Imaging Sciences is a career ladder program to provide advanced training and education for certified imaging technologists. In addition to the program prerequisites, the Bachelor of Science in Imaging Sciences degree program requires a minimum of 95 quarter credit hours taken at the upper division undergraduate level. The professional phase of the program, which consists of imaging sciences course work and clinical fieldwork, is completed at Rush University and its affiliated clinical sites. The program is dedicated to clinical and academic excellence and includes more than 1000 hours of in-hospital clinical practice. As a leadership program in imaging sciences, the program is designed to provide graduates with the opportunity to gain the foundation needed to assume professional leadership roles in clinical practice, clinical specialty areas, education and management.

Students accepted into the professional phase normally begin course work in the fall quarter of the first year of the program, though students may begin taking classes at other times during the year with permission of the program director. Coursework in the professional phase may be taken on a full-time (over 24 months) or part-time basis. Each student will develop an individualized program to be approved by the program director. As a part of the program, graduates will complete the clinical training required to be eligible for post-primary pathway to certification in Computed Tomography, Magnetic Resonance Imaging, Cardiac-Interventional (CI) or Vascular-Interventional (VI) offered by the American Registry of Radiologic Technologists (ARRT).

Imaging Sciences Education Program: Admission Requirements

Requirements for admission to the professional phase of the program in imaging sciences include the following:

- Completion of 60 semester or 90 quarter hours of college or university credit at a regionally accredited college or university
- Minimum overall GPA of at least 2.5 out of 4.0 in all college/university course work
- Prerequisite courses include English composition, college algebra, chemistry, human anatomy and physiology, physics, speech, humanities or social sciences, microbiology, statistics and computer science. Note: Some prerequisites may be taken concurrently while enrolled in the program—for more information, contact the program. All general education requirements must be met prior to the awarding of the bachelor's degree.
- Successful completion of program prerequisites with a grade of at least "C" or higher from a regionally accredited college or university
- Associate's degree in medical radiography or nuclear medicine technology from a program accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT) or the Joint Review Committee on Educational Programs in Nuclear Medicine Technology (JRCNMT). Applicants who have successfully completed an accredited hospital-based program should contact the program director in order to determine if they may be admitted on this basis.
- Licensure or eligibility for accreditation in the practice of medical radiation technology by the Illinois Emergency Management Agency
- Completed application to the program and submission of official transcripts for all college coursework completed
- An interview is scheduled for selected applicants following review of the application materials.
- Ability to perform the essential functions of the job
- All applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language examination (TOEFL). More information about this policy is located in the main College of Health Sciences section of this catalog.

Prerequisite Courses

General Education Courses	Semester Hours	Quarter Hours
Communications (English, composition)	6	8
Speech (oral communication)	3	4
Mathematics (college algebra or higher)	3	4
Humanities, Philosophy or Ethics	6	8
Fine Arts (may not include a performance class)	3	4
Social and Behavioral Sciences (must include one psychology course)	9	12
Elective courses in communications, humanities, fine arts, philosophy, ethics, social sciences, life sciences, physical sciences or computer science to total 60 semester credit hours for the core general education requirements for the college.	4	17
Total	34	57
Science Education Courses	Semester Hours	Quarter Hours
Human Anatomy and Physiology (or 4 hrs. anatomy and 4 hrs. physiology)	8	10
Chemistry (with lab)	4	5
Physics (with lab)	4	5
Microbiology (with lab)	4	5
Computer Science (includes computer literacy)	3	4
Statistics	3	4
Total	26	33

Imaging Sciences Education Program: Academic Policies

Good Academic Standing

High academic performance is expected in required courses. If a student earns grades lower than "C" or the student's cumulative GPA falls below 2.0, the student may not be permitted to register for subsequent courses and may be subject to dismissal from the program. Students who withdraw or who have been dismissed from the program must reapply and will be considered on the same basis as a new applicant. Students requesting readmission must submit a letter to the Office of Admissions.

Academic Probation

During the program, if a student's performance is unsatisfactory (GPA less than 2.0 or a letter grade of less than "C"), he or she may not be permitted to register for subsequent classes. The student will be subject to dismissal from the program. If the student wishes to reenter the program, he or she must reapply and will be considered on the same basis as any new applicant. Students who voluntarily withdraw from the program, either passing or failing, have no guarantee of reinstatement to

the program. Students requesting readmission to the program should submit a letter to that effect to the Committee on Progress and Promotion for Imaging Sciences.

Clinical Work

Students must maintain a cumulative GPA in the program of at least 2.0 unless otherwise described in a given course syllabus, the minimum satisfactory grade for course credit is 75% (a letter grade of "C"), and all stipulated segments of a course must be passed by this standard. Students must demonstrate proficiency in all clinical skills presented in order to pass clinical courses. For all clinical courses, the final exam must be passed at the designated cut score and a grade of "C" or better must be maintained in order to successfully complete each Clinical Practice to continue in the program.

Grievance Policy — Student Appeals

Normal communication regarding course or program policy should be first directed to the instructor assigned to the course or clinical section involved. In the event that the student is unable to satisfy his or her inquiry or request at that level, the matter should be referred to either the clinical director (in the

case of clinical practice) or the department chair (in the case of academic coursework or policy). In the event that the matter in question cannot be resolved at that level, it should be directed to the Committee on Progress and Promotions for Imaging Sciences. This committee will either resolve the matter in question to the student's satisfaction or instruct the student on available mechanisms for appeal as described in the University Catalog and University Student Handbook.

Comprehensive Examination

At the end of the program, the student will complete an end-of-program competency assessment examination; as a part of IS-471, Clinical Practicum IV is required to successfully complete IS-471, as well as meet graduation and program completion requirements (see Graduation Requirements). Students who do not successfully complete the examination will receive an Incomplete ("I") for IS-471 and will retake the examination prior to the beginning of the next quarter. Those failing the examination twice will be enrolled in IS-471 as a directed Independent Study during the next quarter for remediation. Those failing the examination on the third attempt will be subject to dismissal from the program. Those students may reapply to the program (see Procedures for Readmission).

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Imaging Sciences Education Program: Computerized Tomography (CT) Track Curriculum

Professional Courses		
IS-311	Patient Assessment	5
IS-312	Pathophysiology I	5
IS-322	Pathophysiology II	5
IS-324	Pharmacology	4
IS-334	Computed Tomography Position and Protocols	3
IS-441	CT Physics	3
IS-451	Sectional Anatomy and Pathology I	6
IS-461	Sectional Anatomy and Pathology II	6
IS-335	Advanced Radiation Biology	3
IS-442	Radiologic Contrast Agents	3
Leadership Courses		
IS-332	Management	3
RC-401	Education	5
CHS-503	Research and Statistical Methods	5
IDS-510	Health Care in America	2
IS-490	Cultural Competency and Communication	3
IS-452	Health Care Ethics and Critical Thinking	5
Clinical Courses		
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
IS-471P	Clinical Practicum IV	5
Total:		95

NOTE: All professional, leadership and clinical courses require a grade of "C" or better in order for the student to continue in the degree program course sequence with a major in Imaging Sciences. **Failure to complete an Imaging Sciences professional course with a letter grade of "C" or better will subject the student to review by the Committee on Progress and Promotions and may result in the student being dismissed from the program.** Students readmitted to the program at times other than the fall quarter of the second year will pick up the course sequence as prescribed by the Committee on Progress and Promotions for Imaging Sciences.

Sample Two-Year Program of Study — CT Track

Year 1		Credit Hours
Fall Quarter		
IS-441	CT Physics	3
IS-334	Computed Tomography Positioning and Protocols	3
IS-451	Sectional Anatomy and Pathology I	6
Winter Quarter		
IS-461	Sectional Anatomy and Pathology II	6
IS-335	Advanced Radiation Biology	3
IS-312	Pathophysiology I	5
Spring Quarter		
IS-311	Patient Assessment	5
IS-322	Pathophysiology II	5
IS-332	Management	3
Summer Quarter		
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
IS-442	Radiologic Contrast Agents	3
RC-401	Education	5
Year 2		Credit Hours
Fall Quarter		
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
CHS-503	Research & Statistical Methods	5
IDS-510	Health Care in America	2
Winter Quarter		
IS-324	Pharmacology	4
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
Spring Quarter		
IS-452	Health Care Ethics & Critical Thinking	5
IS-490	Cultural Competence & Communication	3
IS-471P	Clinical Practicum IV	5
Total:		95

Imaging Sciences Education Program: Magnetic Resonance Imaging (MRI) Track Curriculum

Professional Courses		
IS-311	Patient Assessment	5
IS-312	Pathophysiology I	5
IS-322	Pathophysiology II	5
IS-324	Pharmacology	4
IS-336	Introduction to MRI	3
IS-443	MRI Positioning and Protocols I	3
IS-451	Sectional Anatomy and Pathology I	6
IS-461	Sectional Anatomy and Pathology II	6
IS-450	MRI Physics	3
IS-473	MRI Positioning and Protocols II	3
IS-442	Radiologic Contrast Agents	3
Leadership Courses		
IS-332	Management	3
RC-401	Education	5
CHS-503	Research and Statistical Methods	5
IDS-510	Health Care in America	2
IS-452	Health Care Ethics and Critical Thinking	5
IS-490	Cultural Competency and Communication	3
Clinical Courses		
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
IS-471P	Clinical Practicum IV	5
Total:		98

NOTE: All professional, leadership and clinical courses require a grade of “C” or better in order for the student to continue in the degree program course sequence with a major in Imaging Sciences. **Failure to complete an Imaging Sciences professional course with a letter grade of “C” or better will subject the student to review by the Committee on Progress and Promotions and may result in the student being dismissed from the program.** Students readmitted to the program at times other than the fall quarter of the second year will pick up the course sequence as prescribed by the Committee on Progress and Promotions for Imaging Sciences.

Sample Two-Year Program of Study — MRI Track

Year 1		Credit Hours
Fall Quarter		
IS-336	Introduction to MRI	3
IS-443	MRI Positioning and Protocols I	3
IS-451	Sectional Anatomy and Pathology I	6
Winter Quarter		
IS-461	Sectional Anatomy and Pathology II	6
IS-450	MRI Physics	3
IS-472	MRI Positioning and Protocols II	3
IS-312	Pathophysiology I	5
Spring Quarter		
IS-332	Management	3
IS-311	Patient Assessment	5
IS-322	Pathophysiology II	5
Summer Quarter		
IS-442	Radiologic Contrast Agents	3
IS-445P	Clinical Practicum I	5
RC-401	Education	5
IS-446	Clinical Seminar I	3
Year 2		Credit Hours
Fall Quarter		
CHS-503	Research & Statistical Methods	5
IDS-510	Health Care in America	2
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
Winter Quarter		
IS-324	Pharmacology	4
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
Spring Quarter		
IS-490	Cultural Competence & Communication	3
IS-452	Health Care Ethics & Critical Thinking	5
IS-471P	Clinical Practicum IV	5
Total:		98

Imaging Sciences Education Program: Interventional Radiology (IR) Track Curriculum

Professional Courses		
IS-311	Patient Assessment	5
IS-312	Pathophysiology I	5
IS-322	Pathophysiology II	5
IS-324	Pharmacology	4
IS-326	Vascular Interventional Technology I	5
IS-327	Vascular Interventional Technology II	5
IS-451	Sectional Anatomy and Pathology I	6
IS-461	Sectional Anatomy and Pathology II	6
IS-335	Advanced Radiation Biology	3
IS-442	Radiologic Contrast Agents	3
Leadership Courses		
IS-332	Management	3
RC-401	Education	5
CHS-503	Research and Statistical Methods	5
IDS-510	Health Care in America	2
IS-490	Cultural Competency and Communication	3
IS-452	Health Care Ethics and Critical Thinking	5
Clinical Courses		
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
IS-471P	Clinical Practicum IV	5
Total:		99

NOTE: All professional, leadership and clinical courses require a grade of "C" or better in order for the student to continue in the degree program course sequence with a major in Imaging Sciences. **Failure to complete an Imaging Sciences professional course with a letter grade of "C" or better will subject the student to review by the Committee on Progress and Promotions and may result in the student being dismissed from the program.** Students readmitted to the program at times other than the fall quarter of the second year will pick up the course sequence as prescribed by the Committee on Progress and Promotions for Imaging Sciences.

Sample Two-Year Program of Study — IR Track

Year 1		Credit Hours
Fall Quarter		
IS-326	Vascular Interventional Technology I	5
IDS-510	Health Care in America	2
IS-451	Sectional Anatomy and Pathology I	6
Winter Quarter		
IS-327	Vascular Interventional Technology II	5
IS-461	Sectional Anatomy and Pathology II	6
IS-312	Pathophysiology I	5
Spring Quarter		
IS-332	Management	3
IS-311	Patient Assessment	5
IS-322	Pathophysiology II	5
Summer Quarter		
IS-442	Radiologic Contrast Agents	3
RC-401	Education	5
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
Year 2		Credit Hours
Fall Quarter		
CHS-503	Research & Statistical Methods	5
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
Winter Quarter		
IS-324	Pharmacology	4
IS-335	Advanced Radiation Biology	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
Spring Quarter		
IS-490	Cultural Competence & Communication	3
IS-452	Health Care Ethics & Critical Thinking	5
IS-471P	Clinical Practicum IV	5
Total:		99

Imaging Sciences Program: Entry Level Magnetic Resonance Imaging (MRI) Curriculum

The Bachelor of Science in Imaging Sciences, Magnetic Resonance Imaging (MRI) track, was designed originally to accommodate applicants licensed in Radiography or Nuclear Medicine. Since that time, there has been increased interest from unlicensed highly qualified applicants. This entry level track in Magnetic Resonance Imaging (MRI) adds three additional patient care courses to the existing MRI curriculum. These courses will serve as bridge courses to provide those students who are unlicensed in Radiography or Nuclear Medicine the academic content needed to be successful in the program.

Professional Courses		
IS-300	Introduction to Imaging Sciences	5
IS-301	Introduction to Patient Care I	5
IS-302	Introduction to Patient Care II	5
IS-311	Patient Assessment	5
IS-312	Pathophysiology I	5
IS-322	Pathophysiology II	5
IS-324	Pharmacology	4
IS-336	Introduction to MRI	3
IS-443	MRI Positioning and Protocols I	3
IS-451	Sectional Anatomy and Pathology I	6
IS-461	Sectional Anatomy and Pathology II	6
IS-450	MRI Physics	3
IS-473	MRI Positioning and Protocols II	3
IS-442	Radiologic Contrast Agents	3
Leadership Courses		
IS-332	Management	3
RC-401	Education	5
CHS-503	Research and Statistical Methods	5
IDS-510	Health Care in America	2
IS-452	Health Care Ethics and Critical Thinking	5
IS-490	Cultural Competency and Communication	3
Clinical Courses		
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
IS-471P	Clinical Practicum IV	5
Total:		113

NOTE: All professional, leadership and clinical courses require a grade of "C" or better in order for the student to continue in the degree program course sequence with a major in Imaging Sciences. **Failure to complete an Imaging Sciences professional course with a letter grade of "C" or better will subject the student to review by the Committee on Progress and Promotions and may result in the student being dismissed from the program.** Students readmitted to the program at times other than the fall quarter of the second year will pick up the course sequence as prescribed by the Committee on Progress and Promotions for Imaging Sciences.

Sample Two-Year Program of Study — Entry Level MRI Track

Year 1		Credit Hours
Fall Quarter		
IS-301	Introduction to Patient Care I	5
IS-300	Introduction to Imaging	5
IS-451	Sectional Anatomy and Pathology I	6
Winter Quarter		
IS-302	Introduction to Patient Care II	5
IS-461	Sectional Anatomy and Pathology II	6
IS-336	Introduction to MRI	3
Spring Quarter		
IS-450	MRI Physics	3
IS-322	Pathophysiology II	5
IS-311	Patient Assessment	5
Summer Quarter		
IS-442	Radiologic Contrast Agents	3
IS-443	MRI Positioning and Protocols I	3
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3
Year 2		Credit Hours
Fall Quarter		
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3
IDS-510	Health Care in America	2
CHS-503	Research & Statistical Methods	5
Winter Quarter		
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3
IS-324	Pharmacology	4
IS-473	MRI Positioning and Protocols II	3
Spring Quarter		
IS-471P	Clinical Practicum IV	5
IS-452	Health Care Ethics & Critical Thinking	5
IS-490	Cultural Competence & Communication	3
Summer Quarter		
IS-332	Management	3
RC-401	Education	5
IS-312	Pathophysiology I	5
Total:		113

Imaging Sciences Education Program: Graduation Requirements

Degree requirements that must be met include:

1. Satisfactory completion of all general education coursework as listed
2. Completion of each required Imaging Sciences professional course with a grade of "C" or better
3. Cumulative grade point average (GPA) of 2.0 or better
4. Successful completion of a comprehensive end-of-program competency assessment

Medical Laboratory Science: Philosophy

The contribution of medical laboratory sciences to patient care and to the health delivery system is primarily one of diagnostic services. The increasing number and wide range of diagnostic tests performed by medical laboratory scientists requires frequent adaptation to new laboratory methodologies and instrumentation. Medicine requires today's medical laboratory scientist to be a highly qualified professional who is willing and able to expand and extend his or her theoretical knowledge and technical skills.

Today's professional medical laboratory scientist must develop technical expertise as well as teaching and administrative competence. He or she must be able to adapt to rapid changes in the field while maintaining an optimal level of performance. As a member of the health care team, the medical laboratory scientist must have a basic understanding of the role of other health practitioners to function effectively and to provide the best possible care. Although work in medical laboratory science often does not place the practitioner in direct contact with the patient, the medical laboratory scientist must maintain compassion and empathy and accept the patient's welfare as the highest priority.

Medical Laboratory Science: Program Overview

The Department of Medical Laboratory Science currently offers two degree programs: the Bachelor of Science, major in Medical Laboratory Science, and the Master of Science, major in Medical Laboratory Science or major in Clinical Laboratory Management. A certificate program—the Specialist in Blood Bank—is offered online. The department also offers a specialized career mobility option for certified medical laboratory technicians (MLTs). Certified MLTs may be able to complete the Bachelor of Science program in four quarters. Entry into the program requires additional prerequisite coursework in addition to an associate of science degree and MLT(ASCP) certification.

Mission of the Department of Medical Laboratory Science

The mission of the Department of Medical Laboratory Science is to graduate competent medical laboratory scientists who possess the knowledge to function at an optimal level in various medical laboratory settings and to meet the changing needs of the profession.

Vision of the Department of Medical Laboratory Science

The Department of Medical Laboratory Science will conduct programs of the highest caliber in medical laboratory science that are recognized as among the best in the U.S. The Medical Laboratory Science graduate is a competent laboratory professional who excels in a collaborative, diverse, and rapidly changing health care environment and has a spirit of inquiry, is committed to lifelong learning and service, and plays an essential role in quality patient care. Graduates of advanced degree/certification programs will be leaders who guide education, promote quality patient care, advocate for the profession, engage in research and scholarly activities, and inspire service.

Educational Goals

- Graduate competent practitioners who possess the skills and knowledge to function at an optimal level in various medical laboratory settings
- Graduate competent laboratorians who can meet the changing needs of the profession
- Foster and develop critical thinking and problem solving
- Instill the highest degree of professionalism
- Instill and foster a high degree of professional ethics
- Promote the importance of continuing education and professional association participation

Functional Expectations for Students

The following is an outline of the expectations for students enrolled in the Medical Laboratory Sciences degree programs. This information is provided so students can be knowledgeable about performance skills expected during coursework and clinical rotations, and also to allow students to determine whether accommodations may be needed due to a disabling condition.

Each student is expected to perform the following, with or without reasonable accommodation. Reasonable accommodation is defined as any change in the environment or in the way activities are usually done that enables an individual with a disability to participate as fully as possible in the academic program.

Accommodations may include modification of policies, practices and procedures or the provision of auxiliary aids for communication. Students must not pose a threat to the safety or well-being of patients, other students, staff or themselves.

Observation: The students must be able to observe demonstrations and exercises in the clinical laboratory sciences involving body fluids and products being tested for biochemical, hematologic and microbiologic constituents, including the use of simple and complex instruments and microscopes.

Communication: The student must be able to communicate clearly and sensitively with patients and family members. The student must be able to communicate effectively and efficiently with all members of the health care team.

Motor: Students must be able to perform tasks using laboratory instruments and glassware dealing with specimen collection and test analysis.

Intellectual-Conceptual, Integrative and Quantitative

Abilities: These intellectual abilities include measurement calculations, reasoning, analysis and synthesis. Problem solving is a critical skill requiring all of these intellectual abilities.

Behavioral and Interpersonal Attributes: Students must possess the emotional health required for full utilization of intellectual abilities. This includes, but is not limited to, the exercise of good judgment and the prompt completion of all responsibilities attendant to the performance of procedures with maximal attention to safety of self and others in dealing with potentially hazardous equipment and materials. Students must be able to tolerate periods of taxing workloads and function effectively under stress and with unpleasant materials. They must be able to adapt to changing environments, to display flexibility and to learn to function in the face of uncertainties inherent in the clinical problems that come to the laboratory. Compassion, integrity, concern for others, interpersonal skills, interest and motivation as well as the ability to maintain confidentiality of patient results are all personal qualities that will be assessed during the education process.

Academic Performance: The student must obtain information from lectures, laboratory sessions/exercises, audiovisual materials and written materials. Students must take essay and multiple-choice tests, complete papers, deliver presentations and perform required lab practice.

A request for accommodation or modification is not cause for withdrawal of the offer of acceptance. Any student can request accommodations once enrolled in the program. If an accommodation is requested, the department may require additional documentation and information and will follow up with the

student to discuss the specifics of the request and the appropriate plan of action. Further information regarding accommodations is available at <http://www.rushu.rush.edu/catalog/aboutrush/disabilityrights.html>.

Specific Program Outcomes

Graduates are expected to:

- Demonstrate entry level competence in pre-analytical, analytical, and post-analytical components of laboratory services.
 - Describe and perform procedures for proper specimen collection and processing of biological specimens.
 - Perform, with a high level of competence, analytical tests on body fluids, cells and blood products.
 - Integrate and relate data generated by various medical laboratory departments while making judgments regarding possible discrepancies and adherence to quality control protocols.
- Describe and apply all safety and governmental regulations and standards for the proper handling of chemical and biological specimens.
- Evaluate the decisions that are made from clinical data.
- Evaluate new techniques being incorporated into daily laboratory operation.
- Demonstrate professional conduct and interpersonal skills with patients, fellow employees, other health care providers and the public.
- Practice and describe principles of quality assurance/quality improvement as applied to the pre-analytical, analytical, and post-analytical components of laboratory services following standard operating procedures.
- Behave in an ethical, culturally sensitive and professional manner following established guidelines.
- Describe and practice instructional techniques and terminology used to educate users and providers of laboratory services.
- Evaluate published studies as an informed consumer knowing research design and practice principles.
- Describe and apply concepts and principles of laboratory operations and management including:
 - Performance improvement
 - Dynamics of healthcare delivery systems as they affect laboratory service
 - Critical pathways and clinical decision making
 - Laboratory informatics
 - Human resource management
 - Financial management

- Participate in ongoing professional career development through active membership in professional societies, attending professional society meetings and maintaining certification.

The Medical Laboratory Science professional program consists of two parts: didactic (classroom learning) and clinical (practice in the medical laboratory). After the completion of the program, graduates should take a national certification examination.

All students entering one of the Medical Laboratory Science degree programs are required to have a criminal background check before matriculating. The student's ability to begin the clinical portion of the program and to complete certification and licensure requirements for entry into the profession may depend on documentation of such things as drug screening and a background check for a history of criminal offenses. A drug screen is required before entering the clinical practica. Students are prohibited from using academic or professional credentials until the satisfactory completion of a degree and appropriate credentials are awarded.

Accreditation

The BS and MS programs in Medical Laboratory Science are accredited by:

National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
5600 N. River Rd., Suite 720
Rosemont, IL 60018-5119
(847) 939-3597
(773) 714-8880
(773) 714-8886 (Fax)
<http://www.naacls.org>

The Specialist in Blood Bank certificate program is accredited by:

Commission on Accreditation of Allied Health Education Programs (CAAHEP)
1361 Park St.
Clearwater, FL 33756
(727) 210-2350
<http://www.caahep.org>

State Licensure Requirements

Some states require that medical laboratory scientists be licensed in the state in order to work in a medical laboratory in that state. Illinois does not license medical laboratory scientists. The Medical Laboratory Science program at Rush University satisfies requirements for certification by the American Society for Clinical Pathology Board of Certification and complies with the standards

of accreditation established by the National Accrediting Agency for Clinical Laboratory Sciences, but may not satisfy the licensing requirements for some states. In particular, our program may not satisfy the requirement for clinical training set by the state of California. Students who intend on moving to a state that has licensure after completion of the program are encouraged to check with the requirements for state licensure before starting the program to make sure that the Rush University curriculum will satisfy the requirements for licensure in that state.

Medical Laboratory Science: Admission Requirements for Bachelor of Science Applicants

Applicants must complete the pre-professional requirements prior to enrollment at Rush University. An overall GPA of 2.5 on a 4.0 scale is required. Three letters of recommendation must be submitted with the admission application. Students are accepted at the beginning of fall and, space permitting, winter quarters. Fall admission is recommended. In addition to fulfillment of academic requirements, a personal interview conducted by members of the Admission Committee is required for admission. Interviews are behaviorally oriented and take about two hours. Questions focus on commitment, problem-solving ability, team interaction and initiative. Applicants are asked for life experience situations in which these behavioral characteristics are demonstrated. At the time of the interview, each applicant will be asked to write a short essay. Essays are evaluated for grammar, spelling, content and overall quality of written communication. Applications are ranked on the basis of grades in prerequisite courses, references, interview results and the written essay. Applicants who have taken their prerequisite coursework at a university outside the United States must have their coursework evaluated by the Educational Credential Evaluators (ECE). In addition, TOEFL and TSE scores must be submitted.

The following prerequisites are required for admission:

1. The following courses are required: 24 quarter/16 semester hours of chemistry (organic, quantitative analysis and biochemistry recommended); 18 quarter/12 semester hours of biology (anatomy and physiology, microbiology and genetics recommended); and 4 quarter/3 semester hours of mathematics (algebra and statistics recommended)
2. Official transcripts from each college or university attended
3. An overall GPA of 2.5 on a 4.0 scale
4. Personal interview
5. Three letters of recommendation
6. TOEFL/TSE if English is not the applicant's first language

Students who have not completed all requirements for entry into the Bachelor of Science program may petition the Department of Medical Laboratory Science for consideration for admission. Such requests are handled on a case-by-case basis.

Bachelor of Science Degree Minimum Core General Education Requirements

Effective January 1, 2009, all entering students must complete the following core general education requirements in order to be eligible for the Bachelor of Science degree.

Requirements*	Semester Hours	Quarter Hours
Two courses in communications (English composition) <i>Composition is required.</i>	6	9
One course in mathematics (college algebra or higher)	3	4
Two courses in life sciences (anatomy, biology, microbiology, pathophysiology, physiology)	6	9
One course in physical sciences (chemistry, physics)	3	4
One course in social sciences (government, history, political science, psychology, sociology)	3	4
One course in humanities (ethics, fine arts, literature, philosophy) <i>Performance courses do not meet this requirement.</i>	3	4
Elective courses in communications, computer science, ethics, fine arts, humanities, life sciences, literature, philosophy, physical sciences or social sciences to total 36 semester (56 quarter) hours	36	56
Total	60	90

Documentation of Hepatitis B Virus Vaccination

Before a student is allowed to begin the program, he or she must have on file documentation that he or she has either begun or has finished the course of inoculations for the Hepatitis B virus vaccine. This documentation must be sent directly to the program director or his or her designate.

If the student has just begun, but has not yet finished, the series of inoculations at the start of the program, he or she must provide documentation that he or she has finished the course of inoculations as soon as possible in order to remain in the program. This information will be reviewed quarterly and the student will be notified if he or she is not in compliance with this requirement. A student who fails to complete the Hepatitis B virus vaccination protocol in a timely manner will not be allowed to register for the following quarter until he or she can provide documentation that he or she is in compliance. Students must submit a Hepatitis B virus titer as proof of immunity.

Documentation of Tuberculosis Testing

All students must provide the results from tuberculosis screening tests in order to begin the program. Students must be tested **annually** for tuberculosis and must submit the results to the Program Office. Failure to comply with this policy can lead to dismissal from the program or prevention of attendance at the clinical site regardless of GPA. In cases where the tuberculosis screen is positive or contraindicated, students must be screened annually by a physician for symptoms of active tuberculosis and submit documentation that they have been screened and are symptom-free.

Required Rush University Medical Center OSHA, HIPAA and Safety Training

Students are required to take all Medical Center training courses that apply to medical laboratory scientists. These courses must be taken annually and are available through Rush University's LEAP Online system. Students failing to remain current in these training areas will not be allowed in the clinical laboratories.

Medical Laboratory Science: Admission Requirements for Master of Science Applicants

Requirements for Medical Laboratory Science Major

Applicants must complete the preprofessional requirements prior to enrollment at Rush University. An overall GPA of 3.0 on a 4.0 scale is required. Three letters of recommendation must be submitted with the admission application. Students are accepted at the beginning of fall and, space permitting, winter quarters. Fall admission is recommended. In addition to fulfillment of academic requirements, a personal interview conducted by members of the Admission Committee is required for admission. Interviews are behaviorally oriented and take about two hours. Questions focus on commitment, problem-solving ability, team interaction and initiative. Applicants are asked for life experience situations in which these behavioral characteristics are demonstrated. At the time of the interview, each applicant will be asked to write a short essay. Essays are evaluated for grammar, spelling, content and overall quality of written communication. Applications are ranked on the basis of grades in prerequisite courses, references, interview results and the written essay.

The following prerequisites are required for admission:

- A Bachelor of Science degree from an accredited United States college or university documented with official transcripts from each college or university attended. The following courses are required: 24 quarter/16 semester hours of chemistry (organic, quantitative analysis and biochemistry recommended); 18 quarter/12 semester hours of biology (anatomy and physiology, microbiology and genetics recommended); and 4 quarter/3 semester hours of mathematics (algebra and statistics recommended).
- An overall GPA of 3.0 on a 4.0 scale
- Personal interview
- Three letters of recommendation
- TOEFL/TSE if English is not the applicant's first language.

Students who have not completed all requirements for entry into the Master of Science program may petition the Department of Medical Laboratory Science for consideration for admission. Such requests are handled on a case-by-case basis.

Documentation of Hepatitis B Virus Vaccination

Before a student is allowed to begin the program, he or she must have on file documentation that he or she has either

begun or has finished the course of inoculations for the Hepatitis B virus vaccine. This documentation must be sent directly to the program director or his or her designate.

If the student has just begun, but has not yet finished, the series of inoculations at the start of the program, he or she must provide documentation that he or she has finished the course of inoculations as soon as possible in order to remain in the program. This information will be reviewed quarterly and the student will be notified if he or she is not in compliance with this requirement. A student who fails to complete the Hepatitis B virus vaccination protocol in a timely manner will not be allowed to register for the following quarter until he or she can provide documentation that he or she is in compliance. Students must submit a Hepatitis B virus titer as proof of immunity.

Documentation of Tuberculosis Testing

All students must provide the results from tuberculosis screening tests in order to begin the program. Students must be tested **annually** for tuberculosis and must submit the results to the Program Office. Failure to comply with this policy can lead to dismissal from the program or prevention of attendance at the clinical site regardless of GPA. In cases where the tuberculosis screen is positive or contraindicated, students must be screened annually by a physician for symptoms of active tuberculosis and submit documentation that they have been screened and are symptom-free.

Required Rush University Medical Center OSHA, HIPAA and Safety Training

Students are required to take all Medical Center training courses that apply to clinical laboratory scientists. These courses must be taken annually and are available through Rush University's LEAP Online system. Students failing to remain current in these training areas will not be allowed in the clinical laboratories.

Medical Laboratory Science Pre-professional Program

The pre-professional curriculum for the Medical Laboratory Science program is taken at an associated college or other accredited college or university and requires two to three years of study, depending upon the college. These years are devoted to preparing the scientific foundation upon which the practice of medical laboratory science can be built. The first year emphasizes courses in biological, physical and behavioral sciences, with options in the humanities. The succeeding years are used to increase depth in the sciences as they relate more specifically to health fields and to enhance personal experience through a broad choice of electives in the humanities. Specific course

offerings and requirements may vary from campus to campus due to curriculum offerings, scheduling and course content. Required prerequisite courses are completed before a student comes to Rush and are listed above.

Professional Program

Students integrate the theory of medical science with the practice of medical laboratory procedures, learning basic theory and skills in hematology, clinical chemistry, immunology, immunohematology, molecular techniques and clinical microbiology in the first year, and go on to more advanced courses in those areas in the second year along with courses in management, education and research to prepare students for supervisory, teaching and research positions.

Students apply basic concepts learned in the first year of the program as they rotate through the laboratories of Rush University Medical Center and affiliated hospitals. Currently, affiliate hospitals include the University of Chicago Medicine,

Northwestern Memorial Hospital, Ann and Robert H. Lurie Children’s Hospital of Chicago, Loyola University Medical Center, and the University of Illinois Hospital and Health Sciences System. It is the policy of the Rush University Department of Medical Laboratory Science that all students admitted into the program and who complete all first-year didactic courses will be guaranteed an opportunity to complete the clinical practicum at one of our affiliated hospitals.

Graduates are eligible to take the Medical Laboratory Scientist certification examination given by the American Society of Clinical Pathology Board of Certification; upon passing this examination, they become certified as Medical Laboratory Scientists, MLS(ASCP). Students are not eligible to take the national certification examinations until all degree requirements are met. Verification of degree completion is required from the program director by the American Society of Clinical Pathology Board of Certification. Graduation from the program is not contingent on successfully passing a certification examination.

Bachelor of Science Curriculum

Year 1		Credit Hours
Fall Quarter		
MLS-300	Laboratory Fundamentals	2
MLS-301	Clinical Chemistry I	4
MLS-310	Hematology I	5
MLS-321	Clinical Immunology	3
MLS-344	Professional Development I	4
Winter Quarter		
MLS-302	Clinical Chemistry II	3
MLS-312	Body Fluid Analysis	5
MLS-330	Microbiology	5
MLS-310	Hematology II	3
Spring Quarter		
MLS-303	Clinical Chemistry III	3
MLS-320	Immunohematology	5
MLS-331	Parasitology, Mycology and Virology	4
MLS-440	MLS Seminar	2
MLS-345	Professional Development II	2
Summer Quarter		
MLS-433	Molecular Techniques	4
MLS-450	LIS and LAS	2
	Clinical Practica*	8

continued

Year 2		Credit Hours
Fall Quarter		
MLS-422	Clinical Immunology II	2
CHS-510	Health Care America	2
CHS-501	Intro to Biostatistics	3
	Clinical Practica*	8
Winter Quarter		
MLS-453	Communications	2
MLS-451	Quality Issues in Clinical Laboratory Sciences	3
MLS-456	Clinical Laboratory Management	3
	Clinical Practica*	8
Spring Quarter		
MLS-432	Infectious Disease Case Studies	2
MLS-467	Comprehensive Review	2
MLS-413	Hematology Case Studies	2
	Clinical Practica*	8
Clinical Practica*		
MLS-478P	Patient Care Techniques	2
MLS-477P	Specialty Practicum	4
MLS-471P	Clinical Practicum—Hematology	4
MLS-472P	Clinical Practicum—Microbiology I	4
MLS-473P	Clinical Practicum—Microbiology II	2
MLS-474P	Clinical Practicum—Immunohematology	4
MLS-475P	Clinical Practicum—Immunology/Molecular	2
MLS-470P	Clinical Practicum—Chemistry	4
MLS-476P	Clinical Practicum—Education	4
* Clinical Practica schedule will be determined by Program Administration.		
Hours Required for MLS BS Degree (not including the 90 quarter hours of general education courses taken at an accredited college or university prior to entry in the program) <i>Curriculum is subject to change.</i>		107 QH

Medical Laboratory Science: Master of Science Curriculum

The program is built around a core of basic and advanced theoretical knowledge and clinical practice. This combination of both theory and practice enhances the development of skilled, knowledgeable professionals whose flexibility allows them to function at highest level within the various laboratory settings available to graduates of the program. These areas include primary health care facilities, as well as research, educational and commercial laboratory settings across the country. This rigorous program requires students to achieve a 3.0 GPA on a 4.0 scale in order to graduate. Students will get hands-on experience in laboratory techniques and will develop a thorough knowledge base

in medical laboratory science, providing a firm foundation for development and growth after graduation. The mission of the faculty is to do more than train technical health care personnel, but to educate medical laboratory professionals who can meet the current and future demands of laboratory medicine. It is expected that students completing the Master of Science degree in Medical Laboratory Science will be the supervisors, managers and educators of the future.

Students in the Master of Science in Medical Laboratory Science program will complete a rigorous research project consisting of identification of the research problem and stating a hypothesis, designing, and performing experiments to solve the research problem, interpreting and analyzing the data, as

well as presenting the research study in written and oral formats which may result in publication in a peer-reviewed journal and/or presentation at a professional society meeting.

Graduates are eligible to take the Medical Laboratory Scientist certification examination given by the American Society of Clinical Pathology Board of Certification; upon passing this

examination, they become certified as Medical Laboratory Scientists, MLS(ASCP). Students are not eligible to take the national certification examination until all degree requirements are met. Verification of degree completion is required from the program director by the American Society of Clinical Pathology Board of Certification. Graduation from the program is not contingent on successfully passing a certification examination.

Year 1		Credit Hours
Fall Quarter		
MLS-500	Laboratory Fundamentals	2
MLS-501	Clinical Chemistry I	4
MLS-510	Hematology I	5
MLS-521	Clinical Immunology	3
MLS-544	Professional Development I	4
Winter Quarter		
MLS-502	Clinical Chemistry II	3
MLS-512	Body Fluid Analysis	5
MLS-530	Clinical Microbiology	5
MLS-511	Hematology II	3
Spring Quarter		
MLS-503	Clinical Chemistry III	3
MLS-531	Parasitology, Mycology and Virology	4
MLS-520	Immunohematology	5
MLS-540	MLS Seminar	2
MLS-545	Professional Development II	2
Summer Quarter		
MLS-533	Molecular Techniques	4
	Clinical Practica*	4–8
CHS-502	Research Methods	3
MLS-550	Laboratory Information and Automation Systems	2
Year 2		Credit Hours
Fall Quarter		
MLS-522	Clinical Immunology II	2
CHS-510	Health Care in America	2
	Clinical Practica*	4–8
CHS-501	Introduction to Biostatistics for the Health Scientist	3
Winter Quarter		
MLS-551	Quality Issues in Clinical Laboratory Sciences	3
MLS-553	Communications	2
	Clinical Practica*	4–8
MLS-556	Clinical Laboratory Management	3

continued

Spring Quarter

MLS-562	Research Seminar III	1
MLS-513	Hematology Case Studies	2
MLS-567	Comprehensive Review	2
	Clinical Practica*	10
MLS-532	Infectious Disease Case Studies	2

Courses Completed During Year 2:

MLS-563	Master's Project I	2
MLS-564	Master's Project II	2
MLS-565	Master's Project III	2

Clinical Practica*

MLS-578P	Patient Care Techniques	2
MLS-571P	Clinical Practicum—Hematology	4
MLS-572P	Clinical Practicum—Microbiology I	4
MLS-573P	Clinical Practicum—Microbiology II	2
MLS-574P	Clinical Practicum—Immunohematology	4
MLS-575P	Clinical Practicum—Immunology/Molecular Biology	2
MLS-570P	Clinical Practicum—Chemistry	4
MLS-576P	Clinical Practicum—Education	4

Hours Required for MS Degree:

113

* *Clinical Practica schedule will be determined by Program Administration.*

* *May substitute Master's Project courses.*

Curriculum is subject to change.

Academic Policies

Midterm Warning Notices

Students not maintaining a passing-level grade at midterm time will be given a written warning notice. It is the student's responsibility to contact the course instructor immediately to ascertain how the grade can be improved.

Academic Progression

High academic performance in required courses is expected. Students will be considered in good standing at Rush University unless placed on academic probation.

A cumulative grade point average of at least 2.5 is required to be eligible to continue in the baccalaureate program, and at least 3.0 is required in the graduate programs. Cumulative grade point averages will be reviewed after each quarter. No student will be permitted into the clinical rotation portion of the program unless the student has the required GPA. The faculty reserves the right to request the withdrawal of a student whose conduct, health or performance demonstrates lack of fitness for continuance in a health profession. Any such student not voluntarily withdrawing will be dismissed from the University.

Academic Probation

Academic probation is assigned to any student in the undergraduate program who receives a quarterly grade point average below 2.5 or whose cumulative grade point average falls below 2.5. Students in the graduate program who receive a quarterly grade point average below 3.0 or whose cumulative grade point average falls below 3.0 will also be placed on academic probation. Students placed on probation have two quarters in which to regain the status of good standing as follows:

The next quarter after being placed on probation, the student must attain a quarterly grade point average of at least 2.5 for undergraduate students or 3.0 for graduate students.

Two quarters after being placed on probation, the student must have a cumulative grade point average above 2.5 (undergraduate students) or 3.0 (graduate students).

Failure to make the minimum quarterly grade point average one quarter after probation or the minimum cumulative grade point average two quarters after probation will result in dismissal from the University.

“D,” “F” or “N” Grades in the Bachelor of Science Program

Undergraduate students who receive an “F” or “N” grade in any course must repeat that course. In the event that a student is required to repeat a course that is a prerequisite for an advanced course, the advanced course may not be taken until the student successfully passes the prerequisite course. Thus, the student’s progression in the program may be affected. Students who receive two “D” grades or a second “F” grade in the same academic year will be dismissed from the program.

All work in practicum courses must be at or above the “C” level for undergraduate students. If a student earns a grade less than “C” in a Clinical Practicum course, the course must be repeated, but may be repeated only once, and must be taken within one year, with the new grade replacing the failing grade in the cumulative grade point average. A second grade below “C” in any practicum course will result in dismissal from the program.

“C,” “D,” “F” or “N” Grades in the Master of Science Program

Graduate students may not receive more than two grades of “C” or lower in the program. Should a graduate student receive a third grade of “C” or lower, he or she will be dismissed from the program. Graduate students who receive a “D,” “F” or “N” grade in any course must repeat that course. In the event that a student is required to repeat a course that is a prerequisite for an advanced course, the advanced course may not be taken until the student successfully passes the prerequisite course. Thus, the student’s progression in the program may be affected. Students who receive a second “D” or “F” grade in the same academic year will be dismissed from the program.

All work in practicum courses must be at or above the “B” level for graduate students. If a student earns a grade less than “B” in a Clinical Practicum course, the course must be repeated, but may be repeated only once, and must be taken within one year, with the new grade replacing the failing grade in the cumulative grade point average. A second grade below “B” in any practicum course will result in dismissal from the program.

Comprehensive Examination

All students must take and pass a comprehensive examination at the end of the second year in order to graduate from the Department of Medical Laboratory Science. Students who fail the cumulative examination must retake the examination until they pass. Diplomas will not be given until the student has passed all sections of the comprehensive examination.

Graduate Research Projects

See the Graduate Research Bulletin and Department of Medical Laboratory Sciences policy document for policies and procedures regarding graduate research projects. This bulletin lists specific deadlines for each component of the research project. Failure to meet these deadlines will delay acceptance of the research project and graduation from the program.

Certification

The comprehensive technical curriculum at Rush University prepares the student to enter the practice of medical laboratory science. Graduates are eligible to take the Medical Laboratory Scientists certification examination given by the American Society of Clinical Pathology Board of Certification.

Service Work Policy

Service work is defined as performing the duties expected of an employee who is paid to perform those tasks as an unpaid student. Service work by students is not required nor permitted by the program. Students are present in the clinical laboratory to learn the operation of the clinical laboratory. While learning and upon demonstrating proficiency, students may perform clinical tests under the supervision of an instructor who is a certified medical laboratory scientist. As such, students work on actual patient samples but at no time are they expected to, nor allowed to, perform service work without pay.

There are numerous work-study jobs available to our students in the clinical laboratories as well as throughout the medical center and at our affiliate hospitals. Students are notified of openings as the faculty are informed. Students and supervisors at the clinical site must make a distinction between the student’s time in the laboratory as a student learning and not being paid and when the student becomes an employee and is working in the laboratory for pay on tasks for which the student has been specifically trained. Students should not be treated as employees during rotation time, which is typically between the hours of 7:00 a.m. and 3:30 p.m. What students do outside the time at which they are expected to be learning in the clinical laboratory is beyond the scope of control of the program.

Graduation Requirements

The **Bachelor of Science degree**, with a major in Medical Laboratory Science, requires a minimum of 180 quarter hours. This includes at least 90 quarter hours earned at a lower division college or university or at an affiliated college. A minimum of 45 quarter hours of academic credit shall be earned as an

upper-division student in academic residence at Rush University. Candidates for the Bachelor of Science degree must earn a 2.5 cumulative grade point average in all computed upper-division credits taken at Rush University. Participation in cap and gown at commencement exercises is expected of all graduates.

The **Master of Science degree**, with a major in Medical Laboratory Science, requires a minimum of 90 quarter hours. Candidates for the Master of Science degree must earn a 3.0 cumulative grade point average in all computed upper-division credits taken at Rush University. A minimum of 45 quarter hours of academic credit shall be earned as a graduate student in academic residence at Rush University. Participation in cap and gown at commencement exercises is expected of all graduates.

Educational Activities

The faculty of the Department of Medical Laboratory Science are responsible for providing both the didactic coursework and the clinical experiences necessary for students to successfully complete all degree requirements.

Research Activities

Faculty members in the Department of Medical Laboratory Science engage in technical and educational research. Areas include biochemistry, education, hematology, hospital administration, immunohematology, immunology, molecular oncology and microbiology. The Department of Medical Laboratory Science supports and is involved in the administration of the Continuing Education Program offered to the professional staff of Rush Medical Laboratories.

Service Activities

The Department of Medical Laboratory Science operates on the practitioner-teacher model. Faculty members are actively involved in the medical laboratories of Rush University Medical Center, maintaining active research, supervisory and clinical positions in their specialty areas. Several faculty members hold joint appointments in Rush Medical College. They provide the laboratory medicine courses for the medical college curriculum and the graduate nursing college curriculum.

Clinical Laboratory Management: Curriculum

The online Master of Science degree program in Clinical Laboratory Management (CLM) is designed for the practicing medical laboratory scientist who desires formal but flexibly delivered graduate education in management. The program emphasizes management principles and quality management, organizational structure and management functions, managerial decision-making and process improvement, human resource management, financial management, compliance and regulatory issues, health care informatics, and legal issues in health care. This program provides a practical approach to managing the day-to-day aspects of the clinical laboratory.

The clinical laboratory manager is employable as supervisory personnel in a hospital, reference laboratory, clinical pathology, physician's office laboratory, industry, public health laboratory, clinical diagnostic company, educational institution or government agency. Students who successfully complete the MS in Clinical Laboratory Management, and possess two years of full-time acceptable experience in clinical laboratory supervision or management within the last 10 years, may apply for the Diplomate in Laboratory Management from the American Society for Clinical Pathology Board of Certification. Students can attend on a part-time or full-time basis.

Minimum Admissions Requirements

- A baccalaureate degree from a regionally accredited U.S. college or university in medical laboratory, biological or related science
- A minimum grade point average (GPA) of 3.0 (on a scale of 4.0)
- ASCP, NCA or other laboratory-related certification
- Two years working experience in an accredited laboratory
- For non-native English speakers, Test of English as a Foreign Language (TOEFL)
- Evaluation by the Educational Credential Evaluators (ECE) of course work completed at a non-U.S. college
- Official transcripts from each college or university attended
- Three reference letters
- A phone interview

Clinical Laboratory Management Curriculum

Year 1		Credit Hours
Fall Quarter		
CLM-590	Principles of Lab Management	4
CLM-591	Evidence-Based Research & Applied Statistics	4
CLM-592	Ethics	3
Winter Quarter		
CLM-584	Health Care Finance	4
CLM-595	Method Comparison & Process Validation	4
Spring Quarter		
CLM-593	Scientific & Technical Writing	4
CLM-596	Quality Systems & Regulatory Issues	4
Summer Quarter		
CLM-597	Issues & Practices in Human Resource Management	4
CLM-598	Health Care Informatics	4
Year 2		Credit Hours
Fall Quarter		
CLM-594	Advanced Health Care Finance	4
CLM-599A	Masters Project I (Management)	2
CLM-589A	Management Experience I	2
Winter Quarter		
CLM-586	Compliance & Regulatory Issues	4
CLM-587	Organizational Development	4
CLM-599B	Masters Project II (Management)	2
CLM-589B	Management Experience II	2
Spring Quarter		
CLM-588	Legal Issues in Health Care	4
CLM-599C	Masters Project III (Management)	2
CLM-589C	Management Experience III	2
Hours required for the M.S. degree		63

Specialist in Blood Bank Technology Certificate Program

Program Overview

The online Specialist in Blood Bank (SBB) Certificate Program is intended to meet the needs of experienced medical laboratory scientists seeking advanced knowledge of immunohematology and its related disciplines. The SBB Certificate program is designed to prepare students for the SBB certification examination offered by the American Society for Clinical Pathology (ASCP) Board of Certification (BOC).

Minimum Admissions Requirements

- A baccalaureate degree from a regionally-accredited U.S. college or university in medical laboratory, biological or related science
- A minimum grade point average (GPA) of 3.0 (on a scale of 4.0)
- Documentation of MLS(ASCP), MT(ASCP), or CLS(NCA) certification
- Two years working experience in an accredited blood bank laboratory
- For non-native English speakers, Test of English as a Foreign Language (TOEFL)

- Evaluation by the Educational Credential Evaluators (ECE) of course work completed at a non-U.S. college
- Official transcripts from each college or university attended
- Three reference letters
- A phone interview

Curriculum

The SBB Curriculum is a one-year program consisting of 8 courses. Students may complete the program in four quarters, including a summer quarter. A part-time option is available.

The SBB curriculum consists of both online lecture/discussion and clinical experience components. Clinical experiences may be arranged at blood centers and hospitals near the student's home. In some cases, the student's place of employment may qualify. Students with prior clinical experience may be eligible to earn credit by proficiency based on standardized departmental evaluation.

The Rush University SBB Certificate Program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) (1361 Park St., Clearwater, FL 33756; 727-210-2350) upon the recommendation of the AABB Committee on Accreditation of Specialist in Blood Bank Technology Schools (AABB/CoA).

Course	Credit Hours
SBB-580 Human Blood Group Systems	4
SBB-581 Principles & Methods of Antibody Identification	2
SBB-582 Blood Procurement & Blood Product Manufacturing	3
SBB-583 Blood Bank & Transfusion Service Operation	3
SBB-584 Clinical Immunohematology & Transfusion	4
SBB-585 SBB Comprehensive Review	3
SBB-586 SBB Clinical Practicum*	2
SBB-587 SBB Selected Topics & Project	3
Total SBB Course Credit Hours Earned	24

*Students with prior clinical experience may qualify to complete the SBB 586 SBB Clinical Practicum course through credit by proficiency based upon standardized departmental evaluation. Qualified students who successfully pass the departmental evaluation will be exempt from taking this course and for tuition associated with this course. Students interested in exemption from SBB 586 should speak with the Specialist in Blood Bank program director and must complete a Clinical Experience Verification Form. A processing fee will be charged to the student. Credit awarded will equal the credit value of the course as listed in the current Rush University Catalog. Information posted on the transcript will include the course prefix and number, title, credit value, and a "K" grade. A transcript guide that accompanies all transcripts issued by the Office of the Registrar explains that the "K" grade indicates that credit was earned through successful completion of a proficiency examination.

Clinical Laboratory Management Curriculum with SBB Certificate Completion Option

Students who are interested in completing the SBB certificate program along with the Master of Science in Clinical Laboratory Management will start the MS in CLM program by taking

courses in the SBB certificate program followed by CLM courses. Graduates of a CAAHEP-accredited SBB program other than the Rush program must have their transcript evaluated to determine the transferability of the SBB courses and assignment of credit. Such students may need to take additional credits to be awarded the MS in CLM.

Year 1		Credit Hours
Fall Quarter		
SBB-580	Human Blood Group Systems	4
SBB-581	Principles & Methods of Antibody Identification	2
Winter Quarter		
SBB-582	Blood Procurement & Product Manufacturing	3
SBB-583	Blood Bank & Transfusion Service Operation	3
Spring Quarter		
SBB-584	Clinical Immunohematology & Transfusion	4
SBB-586	SBB Clinical Practicum*	2
Summer Quarter		
SBB-585	SBB Comprehensive Review	3
SBB-587	SBB Selected Topics & Project	3
Year 2		Credit Hours
Fall Quarter		
CLM-590	Principles of Lab Management	4
CLM-591	Evidence-Based Research & Applied Statistics	4
CLM-592	Ethics	3
Winter Quarter		
CLM-584	Health Care Finance	4
CLM-595	Method Comparison & Process Validation	4
CLM-599A	Masters Project I (Management)	2
Spring Quarter		
CLM-593	Scientific & Technical Writing	4
CLM-596	Quality Systems & Regulatory Issues	4
CLM-599B	Masters Project II (Management)	2
Summer Quarter		
CLM-597	Issues & Practices in Human Resource Management	4
CLM-598	Health Care Informatics	4
CLM-599C	Masters Project III (Management)	2
Total hours required for the MS degree		65

* Students with prior clinical experience may qualify to earn academic credit based on standardized departmental evaluation, or students with extensive clinical experience may complete the SBB-586 Clinical Practicum course through credit by proficiency based upon a standardized departmental evaluation.

Curriculum is subject to change.

Note: Minimum Hours taken at Rush for the MS Degree must equal at least 45 Quarter Hours.

Academic Policies

Midterm Warning Notices

Students not maintaining a passing-level grade at midterm time will be given a written warning notice. It is the student's responsibility to contact the course instructor immediately to ascertain how the grade can be improved.

Academic Progression

High academic performance in required courses is expected. Students will be considered in good standing at Rush University unless placed on academic probation.

A cumulative grade point average of at least 3.0 is required in the CLM program. Cumulative grade point averages will be reviewed after each quarter. The faculty reserves the right to request the withdrawal of a student whose conduct, health or performance demonstrates lack of fitness for continuance in a health profession. Any such student not voluntarily withdrawing will be dismissed from the University.

Academic Probation

Academic probation is assigned to any student who receives a quarterly grade point average below 3.0 or whose cumulative grade point average falls below 3.0. Students placed on probation have two quarters in which to regain the status of good standing as follows:

The next quarter after being placed on probation, the student must attain a quarterly grade point average of at least 3.0.

Two quarters after being placed on probation, the student must have a cumulative grade point average above 3.0.

Failure to make the minimum quarterly grade point average one quarter after probation or the minimum cumulative grade point average two quarters after probation will result in dismissal from the University.

"C," "D," "F" or "N" Grades in the CLM Program

Students may not receive more than two grades of "C" or lower in the program. Should a student receive a third grade of "C" or lower, he or she will be dismissed from the program. Students who receive a "D," "F" or "N" grade in any course must repeat that course. In the event that a student is required to repeat a course that is a prerequisite for an advanced course, the advanced course may not be taken until the student successfully passes the prerequisite course. Thus, the student's progression in the program may be affected. Students who receive a second "D" or "F" grade in the same academic year will be dismissed from the program.

Medical Physics: Philosophy

The Department of Medical Physics offers a program of study and clinical research leading to the Master of Science degree. The faculty members of the department are active in theoretical and experimental research in medical physics and its clinical applications. The faculty's diverse interests allow the department to offer a program that can satisfy students' interests and needs in several areas of medical physics:

- Dosimetry
- Imaging applied to medicine
- Radiation sources
- Physics of radiation oncology
- Physics of diagnostic radiology
- Physics of nuclear medicine
- Radiation protection

Note for the current academic year: The College of Health Sciences offers a Master of Science, major in Medical Physics, degree that provides a curriculum to prepare practitioners. Admission of students to this program in any given year is contingent on a number of factors, including availability of necessary resources, such as faculty, space and equipment, and the level of interest expressed in the applicant pool. The program's leadership has assessed these and other factors and has concluded that no new students will be admitted for the current academic year. Questions about the program and its future plans should be directed to the program director.

Medical Physics: Master of Science Program

The Master of Science, major in Medical Physics, program is offered through the Department of Medical Physics. In order to produce well-rounded, highly competent medical physicists, the curriculum provides training in the physics of radiation therapy, diagnostic radiology, nuclear medicine, radiation protection and radiobiology, as well as in such subjects as anatomy, physiology and computer science.

The department also offers a Medical Physics Residency Program. The primary purpose of this postdoctoral training program is to provide specialized research, instruction and clinical training in cancer radiation treatment-related areas of medical physics.

The counterpart Division of Medical Physics in the Graduate College offers a Master of Science degree with a major in radiological sciences, as well as a Doctor of Philosophy with medical physics as the area of interest.

Medical Physics: Career Opportunities

Medical physics applies the concepts, methods and forces of physics to the diagnosis and treatment of human disease. Medical physicists work at the forefront of medical science, often in hospitals with or without associated academic programs. They provide clinical physics services, carry out research, give direct assistance to their medical colleagues and help train future medical physicists, resident physicians, medical students and medical technologists.

Medical Physics: Admission Requirements

Note for the current academic year: The College of Health Sciences offers a Master of Science, major in Medical Physics, degree that provides a curriculum to prepare practitioners. Admission of students to this program in any given year is contingent on a number of factors, including availability of necessary resources, such as faculty, space and equipment, and the level of interest expressed in the applicant pool. The program's leadership has assessed these and other factors and has concluded that no new students will be admitted for the current academic year. Questions about the program and its future plans should be directed to the program director.

Medical Physics: Academic Policies

Grievances

The department advisory committee, at the request of a student, will resolve a grievance between the student and faculty concerning:

- Course grade and preliminary examination results that may result in the student's dismissal
- Unreasonable delay in completing the dissertation research
- Failure to pass final oral defense of the dissertation

The student may appeal the decision of the department advisory committee to the Graduate College Council and to the Dean, according to the Graduate College policies and procedures.

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Medical Physics: Academic Progression

Academic Progression

The graduate program director acts as academic advisor to each new student. The director determines the course schedule with students and monitors their progress. The faculty reserves the right to request the withdrawal of any student whose conduct, health or performance is unsuitable for a health profession. Any such student not voluntarily withdrawing will be dismissed from the University. Only grades of A, B and C in required courses may fulfill degree requirements. Students will be considered in good standing at Rush University unless placed on academic probation. Academic probation is assigned to a student who earns a quarterly GPA between 2.0 or 2.99 inclusive or whose cumulative grade point average falls below 3.0. Full-time students placed on probation must earn a cumulative GPA of 3.0 or greater by the end of the next two consecutive quarters. A student who earns a quarterly grade point average below 2.0 will be dismissed from the University. A student who earns a grade of D or F in a required course must repeat the course. Failure to earn a grade of C or better in a repeated course will result in dismissal from the University. In a repeated course, the new grade will replace the earlier D or F grade in the cumulative GPA. A student who earns a grade of D or F in two or more required courses will also be dismissed from the University. Students placed on academic probation will be notified by letter from the department chairperson following a meeting of the Student Progress Review Committee. The letter will explain why the student was put on academic probation and the specific requirements the student must meet to re-establish good standing.

Full-Time and Part-Time Enrollment

Although the faculty recommends full-time enrollment to maximize the opportunities available to students, part-time enrollment for all or part of the program may be arranged.

Note for the current academic year: The College of Health Sciences offers a Master of Science, major in Medical Physics, degree that provides a curriculum to prepare practitioners. Admission of students to this program in any given year is contingent on a number of factors, including availability of necessary resources, such as faculty, space and equipment, and the level of interest expressed in the applicant pool. The program's leadership has assessed these and other factors and has concluded that no new students will be admitted for the current academic year. Questions about the program and its future plans should be directed to the program director.

Medical Physics: Graduation Requirements

Master of Science in Medical Physics

The program requires a cumulative grade point average of 3.0 or greater to graduate. All degree requirements must be completed within five calendar years from the beginning of the first quarter in which the student is enrolled in the program. The minimum number of quarter hours required for graduation is 80. This requirement is fulfilled by registration in required courses plus elective courses. Each student must develop and carry out a research project that culminates in writing a thesis. At the end of the first year, the student must take and pass a qualifying examination based on selected basic principles of physics, therapeutic and imaging physics, radiation protection, transfer function analysis and current topics in medical physics. The examination will include both written and oral components. Passing this examination qualifies the student to continue work toward the master's degree. Defense of the thesis will be the final examination. The faculty members will determine whether the student will be granted a second and last opportunity. Upon such recommendation, a second examination may be scheduled within nine months of the initial examination.

Medical Physics: Educational Activities

In addition to providing educational and research experiences for students in the master's program, the medical physics faculty members, most of whom hold joint faculty appointments in Rush Medical College, teach medical students and other students and residents.

Medical Physics: Research Activities

- Study of basic mechanisms by which radiation transfers energy to biological and chemical materials
- Development of new techniques for directing and measuring various radiations used in the detection, diagnosis and treatment of cancer
- Application of radioactive tracers to diagnosis and to the study of metabolic processes
- Optimization of physical parameters for diagnostic medical imaging including radiography, computerized tomography, magnetic resonance imaging and radionuclide imaging
- Optimization of treatment plans for cancer radiotherapy
- Incorporation of biological models in radiation treatment planning
- Radiation beam modulation and image guidance applications in radiation therapy

Rush University annually issues a report that summarizes research projects of the entire faculty.

Medical Physics: Service Activities

Most faculty members are practitioner-teachers who provide patient care services through Rush University Medical Center. Students have the opportunity to participate in clinical physics services under the supervision of faculty members.

Medical Physics: Residency Program in Radiation Oncology Physics

The primary purpose of this training program is to provide specialized research, instruction and clinical training in cancer radiation treatment-related areas of medical physics. Candidates applying for this program should have a graduate degree in physics, engineering or computer science, and have demonstrated ability to perform high-quality research. Another important purpose of this program is to provide the trainees with sufficient academic and clinical experience so that they can become eligible for certification by the American Board of Radiology in therapeutic radiological physics. Our program is accredited by the Commission on Accreditation of Medical Physics Education Programs (CAMPEP).

Application

The applicant should have received a graduate degree in physics, medical physics or other related fields. Graduates from CAMPEP-accredited graduate medical physics and certificate programs as well as candidates with background satisfying an alternative pathway based on American Association of Physicists in Medicine (AAPM) Report 197S will also be considered. There should be evidence of a candidate's ability to conduct independent research and to learn clinical and research aspects of radiation oncology physics. Good communication skills and the ability to effectively interact with other professionals are highly desirable. On-site interviews will be conducted for selected candidates. Interviews will include a 10-15 minute presentation on topics selected by the candidate.

In order to be considered for this program, each candidate must submit the following:

1. A letter of application stating career goals and motivation toward medical physics
2. Curriculum vitae, including list of publications **with applicant's name highlighted** among co-authors

3. Three letters of recommendation
4. Official transcripts of undergraduate and graduate studies
5. Title and abstract for a short presentation

The Rush University Medical Physics Residency Program accepts applications through the AAPM Residency Common Application System (CAP) at <http://www.aapm.org/cap/>. Items 1-4 above are required for CAP submission. Item 5 should be submitted via email to Mylene Mauclair (mylene_mauclair@rush.edu). We are participating in the 2015 Medical Physics Match Program at <https://natmatch.com/medphys/>. To apply, applicants must participate in the Match and enter code number 12011 for our program.

Program Design

The medical physics residency training program is designed to educate and to train candidates with a graduate degree in physics, medical physics or closely related fields to a competency level that will allow them to practice radiation oncology physics and to be prepared to sit for the certification examination of the American Board of Radiology (ABR) in therapeutic radiological physics upon graduation. The program is organized in accordance with the American Association of Physicists in Medicine Report No. 90: Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs, 2006. The program covers all aspects of clinical radiation oncology physics, including acceptance/commissioning, calibration and quality assurance of treatment and simulation equipment, radiation detectors, measurement and calculation of radiation dose, radiation treatment planning, design and fabrication of treatment aids, quality assurance of planning systems, external beam treatment techniques (including 2D, 3D conformal, intensity modulated [IMRT] and image guided [IGRT] radiation therapy techniques), low- and high-dose-rate brachytherapy (LDR and HDR), special procedures, radiation safety for both patients and radiation workers, room shielding designs, regulatory radiation safety guidelines and education of health professionals in radiation oncology physics.

Program Length

The length of the program is three years. The resident will attend classes and clinical conferences, provide assistance in performing various quality assurance tasks and participate in clinical research and development projects during the first year. The resident will start clinical rotations in various areas at the beginning of the second year. Completion of eight structured clinical rotations is required for the second and third year. A mentoring staff physicist will directly supervise the resident and monitor

his or her progress during the rotation. Evaluations of residents' performance in each rotation will be documented and communicated to the residents.

Program Faculty

The Department of Radiation Oncology has six PhD-level physicists and six attending physicians. All physicians and physicists are either ABR certified or in the process of getting their certification. All faculty are active in clinical services, teaching and research. Our faculty are excellent teachers; our medical residents have consistently ranked above the ninetieth percentile in the American College of Radiology (ACR) in-service physics board exams of the past. In addition, we offer excellent courses in radiobiology, statistics and imaging physics. All these courses, as well as other courses offered by Rush University, are available to medical physics residents.

Facility and Equipment

The Department of Radiation Oncology is equipped with a large-bore 4D CT simulator, a PET/CT scanner, a TomoTherapy system, a dedicated TrueBeam STX unit for SRS and SBRT, two additional state-of-the-art linear accelerators, a Nucletron HDR unit with Oncentra treatment planning system, a Pinnacle 3D treatment planning system, an Eclipse treatment planning system, a Brainlab stereotactic radiosurgery planning (iPlan) and treatment system, in vivo dosimetry systems, a film dosimetry system, and a 3D data acquisition system. The department has active clinical and research programs in IGRT, IMRT, TBI, SRS, SBRT, brachytherapy, Monte Carlo simulations, thermal imaging, scatter imaging, dose painting, contour segmentation, and biological model-based treatment planning applications in radiation therapy.

Program Delivery

The program director, in collaboration with the Medical Physics Residency Committee, is responsible for the administration of the program. It is the program director's responsibility to advise the residents, coordinate clinical rotations and didactic training, and evaluate and promote the program. The committee meets regularly to review the progress of the residents and the operation of the program. All clinical training takes place in the Department of Radiation Oncology. The Office of Graduate Medical Education (GME) monitors and reviews the quality of the program and provides oversight to assure its adherence to the Commission on Accreditation of Medical Physics Education Programs (CAMPEP) standards.

Occupational Therapy: Mission and Philosophy

The Department of Occupational Therapy at Rush University Medical Center and Rush University is committed to teach, investigate, and provide the very best quality health care. The department is grounded in the practitioner-teacher-investigator model with an emphasis on leadership and relationships with professional and societal communities. The Department promotes excellence in addressing diversity in health care.

Occupational therapists recognize humans as persons engaged in and organized around occupations. When dysfunction prevents doing, occupational therapists enable doing in a variety of ways. The practice of occupational therapy involves individuals, their attributes, and the multiple environmental components that surround the performance of occupations. Occupational therapy interventions are directed at these variables to ameliorate and enable occupational performance.

The faculty members are practitioners-teachers and researchers, a combination that infuses the curriculum with a contemporary and scholarly perspective. Graduate courses are designed to build on past knowledge and experience as well as encourage transformative learning. The critical self-reflection of the transformative learning process encourages the examining, questioning, validating and possible revision of prior knowledge so that new perceptions and meanings may be constructed. It results in the learner being able to wholly and freely participate in critical dialogue and the resulting action, thus empowering the learner (Cranston, 1994). By basing the program on transformative learning, it is possible to build on the students' past, connect it to their activities of the present, and predict a future in which they are competent and capable to respond to the needs of the profession.

These learning experiences, occurring within and outside the classroom, promote independence in conjunction with faculty mentorship, problem solving, and critical thinking. Because of the graduate's experience in self-directed learning, he or she is able to be responsible and responsive to the needs of the increasingly dynamic profession. The graduate is a potential learner in the field who is able to work in the traditional and diverse occupational therapy settings, but more importantly, the graduate is flexible, autonomous, and informed so as to adapt to the changing demands of practice.

Occupational Therapy: Program Overview

Professional Description

The Department of Occupational Therapy offers a graduate program that prepares the student for unique contributions to the field of occupational therapy. This professional level program is designed for individuals with baccalaureate degrees in other fields who are seeking to become occupational therapists.

Educational Orientation

The professional graduate program at Rush University is designed for the student who has acquired a variety of life experiences through previous educational, vocational and avocational activities. The program values the incorporation of these life experiences into the educational activities of the program. The educational approach utilized in the program that best addresses these spheres is based on theories of adult learning. By basing the program on adult learning theories, it is possible to build on the students' past, connect it to their activities of the present and predict a future of competent, capable responses to the needs of the profession. The program is designed to enable the student to learn not only the content and theories of occupational therapy, but also the process of utilizing the multiple resources of the learning environment, including teachers and peers. A series of carefully designed learning experiences, occurring within and outside the classroom, promote independence in conjunction with collegial interaction, problem solving and clinical reasoning, and analysis and synthesis of information. The graduate emerges as a competent therapist who has maintained initial curiosity and added to it through increased ability for creative thinking. Because of experiences in self-directed learning and self-identification of needs, the graduate is able to be responsible and responsive to the needs of the profession. The graduate is expected to be a life-long learner capable of maintaining professional integrity when faced with challenges and complexities of contemporary health care.

Professional Orientation

Since the Rush graduates will be prepared to work in a variety of traditional and nontraditional settings, their practice base is the result of broad experiences within the many arenas of occupational therapy. The graduates have the ability to add increasing amounts of depth and validation to their treatment programs as a result of their involvement and experiences with problem-solving approaches to therapy. Given the combination of breadth and depth of knowledge and experience related to occupational therapy treatment, the primary strength of Rush University graduates will be their ability to function as highly resourceful practitioners. As in the past, and for the foreseeable

future, the role of the practitioner is the core of all occupational therapy. The practitioner who is able to base treatment on established fact, use internal and external resources, and engage in clinical reasoning and problem solving is the practitioner who will contribute to the credibility and viability of the profession. It is this type of practitioner who is expected to be the product of the Rush program.

The graduates of the program are able to enter the clinical arena competently and confidently, applying their clinical skills and expanding upon those skills as individual situations require. This continuous process of assessment and expansion contributes to the personal and professional growth vital to occupational therapists. The role of the clinician, as it is understood in this context, incorporates other major roles of the therapist. As the Rush program is designed, the students have the opportunity to explore the functions of the therapist as an educator, researcher and manager from the practitioner's perspective. The involvement of the student in these other roles is another major strength of the program. The additional roles of educator, manager and researcher cannot be separated from the practitioner's role.

Occupational Therapy: Admission Requirements

The applicant to the professional program in occupational therapy must have completed or must show evidence of the following in order to be considered for admission:

- Completed application through the Occupational Therapy Centralized Application System
- A baccalaureate degree from an accredited college or university, with a recommended minimum grade point average of a 3.0 on a 4.0 scale
- Official scores from Graduate Record Examination (GRE) General Test taken within the past five years are required. A combined score (verbal and quantitative portions) of 302 on the revised test (1000 prior to August 2011) and a minimum score of 4.0 on the analytical writing sample are required.
- Prerequisite courses including statistics, sociology or anthropology, human growth and development (must cover the entire lifespan), two psychology courses in addition to human growth and development, and human anatomy (with lab, preferably cadaver) and human physiology (lab preferred). Human anatomy and human physiology must be taken within five years prior to admission to program. Two sequential courses with labs will also satisfy this prerequisite.

- Two letters of recommendation. One recommendation must be from an occupational therapy practitioner.
- Official transcripts from every college or university attended by the applicant
- Experience/familiarity with occupational therapy through either observation, volunteering or work experience with an occupational therapy practitioner

The Admissions Committee will make decisions regarding the acceptability of the applicant to the program. All application materials will be evaluated. Academic and nonacademic factors, including extracurricular activities, job and life experiences will be taken into consideration. Selected applicants will be required to participate in an on-site visit that will include a faculty interview. Recognizing the need of occupational therapists to serve a population representative of diverse social, ethnic, cultural and economic backgrounds, a goal of the Admissions Committee will be to select a class likely to meet these diverse needs.

Application Deadlines

Admission is granted for the summer quarter of each year, which begins mid-June. Applications become available online August 1. Completed applications will begin to be reviewed by the Admissions Committee beginning October 15. The application closes on December 1. Interviews will be held during the month of November. Enrollment is limited to 34 students. Applicants are encouraged to apply as early as possible.

Students accepted into the Occupational Therapy program must complete a criminal background check. Note: Students who have certain types of information in their criminal background checks may be ineligible to complete fieldwork rotations in specific facilities and/or may be ineligible for state licensure and/or national registry or certification.

Occupational Therapy: Academic Policies Enrollment

The academic program is a 27-month program covering nine academic quarters. Instruction is provided by occupational therapy faculty and faculty members from other departments and colleges within the University. Students must complete all program requirements within 39 months from the time they begin the program. A minimum of 117 credits is required for graduation.

Accreditation and Certification

The Occupational Therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association. Additional information can be obtained by contacting:

Accreditation Council for Occupational Therapy Education (ACOTE)
c/o Accreditation Department
American Occupational Therapy Association (AOTA)
4720 Montgomery Lane, Suite 200
Bethesda, MD 20814-3449
(301) 652-6611
www.acoteonline.org

Graduates will be eligible to sit for the national certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy (NBCOT). Additional information can be obtained by contacting:

NBCOT
12 South Summit Ave., Suite 100
Gaithersburg, MD 20877
(301) 990-7979

After successful completion of this exam, the individual will be an Occupational Therapist, Registered (OTR). In Illinois, occupational therapists must be licensed in order to practice, and state licensure is based on the results of the NBCOT certification examination. This is true in many other states, but specific requirements for licensure may be determined by contacting individual state licensing boards.

Academic Progression

The faculty reserves the right to request the withdrawal of any student whose conduct, health or performance demonstrates lack of fitness for continuance in a health profession. Any such student not voluntarily withdrawing will be dismissed from the University. Only grades of A, B or C may fulfill degree requirements in all required courses. Students will be considered in good standing at Rush University unless placed on academic probation. Academic probation is assigned to a student who earns a quarterly GPA between 2.0 and 2.99, inclusive. Students placed on probation must earn a cumulative grade point average of 3.0 or greater at the end of the next consecutive quarter.

Students placed on academic probation for the first time must meet with their advisor and establish an action plan prior to the beginning of the next quarter. If a student is placed on probation a second time, he or she must petition and meet with the

Student Performance and Academic Review Committee (SPARC) and provide an action plan that is acceptable to SPARC in order to continue in the program. The student will also be responsible to meet on a regular basis with his or her advisor to monitor the progress of the aforementioned action plan's implementation. A student who is placed on probation for a third time for didactic coursework will automatically be dismissed from the program. A student receiving a grade of D or F or WF in a required course must repeat the course and earn at least a C to remain in the program. Only one D or F or WF is allowed per academic year, and no more than two are allowed in the entire program. Anyone receiving more than one D or F or WF in an academic year or more than two during the program will be dismissed from the program. Furthermore, a student who fails (receives a grade of No Pass) two fieldwork experiences (Level I and/or Level II) will be automatically dismissed from the program.

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Occupational Therapy Curriculum

Curriculum		
Summer Quarter		
OCC-502	OT History and Philosophy	4
OCC-504	Human Structure and Principles of Movement	4
OCC-531	Principles and Methods of Education	2
OCC-505	Clinical Foundational Skills	2
OCC-506	Medical Conditions Seminar	3
Fall Quarter		
CHS-510	Health Care in America	2
OCC-503	Occupation and Health Across the Lifespan	3
OCC-507	Psychosocial Dysfunction	3
OCC-510	OT Perspectives in Ethics and Multiculturalism	3
CHS-501	Introduction to Biostatistics for the Health Scientist	3
Winter Quarter		
OCC-508	Group Dynamics	3
OCC-509	Analysis of Occupational Performance	3
OCC-525	Introduction to Neuroscience	4
OCC-581	Qualitative Research Methods and Design	2
OCC-582	Research Methods and Evidence-Based Practice	3
Spring Quarter		
OCC-511	OT Interventions I	5
OCC-516	OT Interventions I—Fieldwork	1
OCC-543	Health Care Organizations	3
OCC-538	Evaluation and Assessments	3
OCC-583	Graduate Research Project**	0
Summer Quarter		
OCC-512	OT Interventions II	5
OCC-517	OT Interventions II—Fieldwork	1
OCC-532	OT Perspectives in Technology	2
OCC-536	Issues and Perspectives in Pediatric OT	4
OCC-537	Issues and Perspectives in Geriatric OT	3
OCC-583	Graduate Research Project**	0
Fall Quarter		
OCC-513	OT Interventions III	5
OCC-514	OT Interventions IV	4
OCC-518	OT Interventions III—Fieldwork	1
OCC-583	Graduate Research Project**	0
Winter Quarter		
OCC-595	Advanced Fieldwork I	12
Spring Quarter		
OCC-596	Advanced Fieldwork II	12
Summer Quarter		
OCC-544	Management Concepts for OT	3
OCC-583	Graduate Research Project**	6
OCC-590	Advanced Practice Seminar	3
Hours Required for MS Degree:		117

** OCC-583 Research III is a continuous course beginning in the fourth quarter with a grade and credit assigned upon completion of the ninth quarter.

Occupational Therapy: Graduation Requirements

The Master of Science with a major in occupational therapy requires a cumulative grade point average of 3.0 or greater to graduate. All degree requirements including fieldwork must be completed within 39 months. A minimum of 117 quarter hours is required for graduation.

Occupational Therapy: Research Activities

Members of the department are increasingly involved in identifying research projects in occupational therapy. The students participate in faculty-supervised, evidence-based clinical-outcome studies, which may be carried out in one of Rush University Medical Center's occupational therapy clinics.

Occupational Therapy: Service Activities

The faculty are outstanding practitioners/teachers/investigators involved in widely recognized professional and scholarly activities. They provide a full range of assessment and therapeutic services for a variety of populations. Within the Medical Center there are more than 30 dedicated occupational therapy practitioners working with pediatric, adult and geriatric patients in both inpatient and outpatient settings. In addition, faculty and clinicians are committed to serving with professional and community organizations. Students participate with faculty and clinicians in health fairs and service activities throughout the year. Students have an opportunity to join the Student Occupational Therapy Association (SOTA), a service-based organization.

Perfusion Technology: Philosophy

The Department of Perfusion Technology provides students with both the scientific knowledge and the clinical experience needed in order to make them effective and successful perfusion technologists. In the challenging, expanding profession of perfusion technology, today's perfusion technologist must be able to meet the daily demands of the operating room, adapt to new technologies and uses for the extracorporeal circuit and be part of a profession growing beyond its traditional roles in cardiovascular surgery which now encompasses other surgical and nonsurgical specialties requiring the use of extracorporeal circuits, support devices or blood salvaging capabilities.

Perfusion Technology: Program Overview

The Department of Perfusion Technology offers two degree programs; the Bachelor of Science with a major in Perfusion Technology and the Master of Science with a major in Perfusion

Technology. The Master of Science degree is intended for those whose baccalaureate degree is in a field other than perfusion technology. Those entering the Master of Science degree program achieve entry-level competency in perfusion technology as well as acquire additional skills in educational methods, management and research.

This technical medical specialty has become increasingly important in the health care field. The perfusion technologist serves primarily as part of the cardiovascular surgical team, operating the heart-lung machine during open heart surgery. The perfusion technologist is also responsible for other life-support equipment, such as intra-aortic balloon pumps and ventricular assist devices. In addition to cardiovascular surgery, the perfusion technologist may also provide veno-venous bypass for liver transplantation, isolated limb or organ chemotherapy perfusion, cardiopulmonary bypass supported cardiac catheterization procedures, extracorporeal membrane oxygenation (ECMO) and blood salvaging for orthopedic or general surgery procedures.

Perfusion Technology: Admission Requirements

Bachelor of Science Program

A minimum of 60 semester or 90 quarter hours of liberal arts and sciences must be completed prior to enrolling. This must include the required prerequisite coursework.

The following are required for admission:

- Cumulative and science grade point average (GPA) of 3.0 on a 4.0 scale
- Completion or a plan to complete all the required prerequisite coursework prior to enrolling at Rush
- Receipt of three letters of recommendation
- Applicants who did not complete high school in the U.S. must submit TOEFL scores.
- Receipt of official transcripts from each institution of higher education attended

Once a complete application has been received, it will be reviewed and applicants will be selected to interview. If selected, completion of an on-site faculty interview is required to be considered for admission.

The Admissions Committee will take into consideration all application materials when evaluating an applicant.

The following courses must be completed prior to enrolling with a grade of "C" or better. Required courses must be taken for a letter grade rather than a pass/fail option.

Natural and Biological Sciences

16 semester hours or 24 quarter hours. Science courses must include:

- One semester of inorganic chemistry
- One semester of organic chemistry
- One semester of physics
- One semester of a human anatomy course, AND
- One semester of a human physiology course, OR
- Two semesters of a combined anatomy and physiology course with a laboratory component

Some community college introductory science classes may not be comprehensive enough to satisfy the prerequisite requirements. For any questions about courses please contact the Office of College Admission Services at (312) 942-7100 to speak with an admissions counselor.

Mathematics and Statistics

Two college level mathematics courses, which must include an introductory course in statistics.

English Composition

Two courses or documented proficiency at Composition II level. Although not required, applicants are encouraged to take additional courses focusing on written communication because writing skills are essential for the successful completion of the Perfusion Technology program.

Social Sciences

14 semester hours or 20 quarter hours

Coursework must include:

- Introduction to Psychology
- Introduction to Sociology
- Other social science courses; may include psychology, sociology, economics, history and anthropology

Humanities

Eight semester hours or 12 quarter hours

- Humanities courses include religion; philosophy; foreign languages; literature; or the history of art, music, theater, film or dance. Studio art classes, instrumental music classes, and speech classes are not acceptable.
- **Medical Terminology is strongly recommended.**

Additional Recommendation

In addition, it is highly recommended that prospective students talk to a clinical perfusionist and, if possible, observe a procedure requiring the use of cardiopulmonary bypass.

Master of Science Program

- A baccalaureate degree from an accredited college or university
- Receipt of official transcripts from each institution of higher education attended
- If the baccalaureate degree was conferred by a college or university outside the United States, international transcripts must be evaluated by the Educational Credential Evaluators (ECE). A detailed course-by-course report is required. Contact ECE at (414) 289-3400 or www.ece.org.
- Completion or a plan to complete all the required prerequisite coursework prior to enrolling at Rush. Applicants must complete all prerequisite courses with a grade of "C" or better. Please see required courses as listed for the Bachelor of Science degree above.
- Cumulative and science GPA of 3.0 on a 4.0 scale
- Receipt of three letters of recommendation
- Applicants who did not complete high school in the United States must submit TOEFL scores.

Perfusion Technology: Academic Policies

The Department of Perfusion Technology requires full-time enrollment beginning with the fall quarter of the junior year and continuing through the spring quarter of the senior year, a total of seven consecutive quarters of classroom work and clinical experience.

Academic Progression

High academic performance in required courses is expected. Only grades of A, B or C may fulfill degree requirements in all required courses. Students will be considered to be in good standing unless placed on academic probation. Academic probation is assigned to any undergraduate student who earns a quarterly grade point average (GPA) below 2.5 (A = 4.0) or for graduate students who earn a quarterly GPA below 3.0 (A = 4.0). Students placed on probation have two quarters in which to regain the status of good standing. Failure to do so will result in dismissal from the University. As most courses are offered only once each year, students who receive a grade of F may have to defer enrollment until the course is offered again. A grade of F in a course that is a prerequisite to another required course may also prevent a student from continuing to progress in the normal sequence. The Department's Advisory Committee must approve any exception to these policies.

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Perfusion Technology: Curricula

The curriculum in Perfusion Technology combines rigorous didactic research curriculum with diverse clinical experience. Perfusion technology students take courses in anatomy, physiology, pathology and pharmacology. The clinical experience includes participation in adult and pediatric open heart procedures at Rush University Medical Center and at affiliated hospitals.

The curriculum begins in the fall quarter, which begins in early September, and continues for seven quarters, including one

summer session. Faculty include experienced perfusion technologists and cardiovascular and transplant surgeons in addition to specialists from anesthesia, nursing, medical technology and other related health professions. During the third quarter, students will choose and develop a research project from its inception to completion. The culmination of the project will be the preparation of a manuscript suitable for publication in a professional journal.

Graduates of the program will be qualified to sit for the certification examination of the American Board of Cardiovascular Perfusion.

Bachelor of Science Curriculum

Year 1		Credit Hours
Fall Quarter		
PRF-301	Perfusion Technology	3
PRF-331	Anatomy and Physiology I	5
HHV-504	Ethics in Health Care	2
CHS-501	Biostatistics	3
PRF-311	Junior Seminar I	3
Winter Quarter		
PRF-333	Pharmacology	3
PRF-312	Junior Seminar II	5
PRF-302	Pathophysiology of CPB I	5
PRF-332	Anatomy and Physiology II	3
Spring Quarter		
PRF-381	Project Design and Research	3
PRF-303	Pathophysiology of CPB II	5
PRF-313	Junior Seminar III	3
CHS-510	Health Care in America	2
Summer Quarter		
PRF-441	Project Design and Research I	2
PRF-451	Senior Seminar I	2
PRF-431	Clinical Experience I	10
Year 2		Credit Hours
Fall Quarter		
PRF-442	Project Design and Research II	2
PRF-432	Clinical Experience II	10
PRF-452	Senior Seminar II	2
Winter Quarter		
PRF-443	Project Design and Research III	2
PRF-433	Clinical Experience III	10
Spring Quarter		
PRF-444	Project Design and Research IV	2
PRF-434	Clinical Experience IV	10
PRF-452	Senior Seminar III	2
Hours Required for BS Degree:		99

Master of Science Curriculum

Year 1		Credit Hours
Fall Quarter		
PRF-501	Perfusion Technology**	3
PRF-521	Anatomy and Physiology I	5
HHV-504	Ethics in Health Care	2
CHS-501	Biostatistics	3
PRF-510	Seminar I**	3
Winter Quarter		
PRF-523	Pharmacology**	3
PRF-511	Seminar II**	5
PRF-502	Pathophysiology CPB I**	5
PRF-522	Anatomy and Physiology II	3
CHS-502	Research Methods	3
Spring Quarter		
PRF-541	Project Design/Research	3
PRF-503	Pathophysiology CPB II *	5
CHS-510	Health Care in America	2
PRF-512	Seminar III**	3
PRF-552	Advanced Topics: Cardiac Pharmacology	2
Summer Quarter		
PRF-542	Masters Project I	2
PRF-531	Clinical Experience I**	10
PRF-513	Seminar IV**	2
Year 2		Credit Hours
Fall Quarter		
PRF-543	Masters Project II	2
PRF-532	Clinical Experience II**	10
PRF-551	Advanced Topic: Cardiac Physiology	2
Winter Quarter		
PRF-544	Masters Project III	2
PRF-533	Clinical Experience III**	10
PRF-554	Advanced Topics: Educational Methods**	2
Spring Quarter		
PRF-545	Masters Project IV	2
PRF-534	Clinical Experience IV**	10
PRF-553	Advanced Topics: Management	2
Hours Required for MS Degree:		106

**Denotes required term papers

Perfusion Technology: Educational Activities

The faculty of the department is responsible for providing both the didactic coursework and the clinical experiences necessary for the completion of the Bachelor of Science and the Master of Science degrees in perfusion technology. The program is accredited by the Accreditation Committee-Perfusion Education (AC-PE) of the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

Perfusion Technology: Service Activities

Faculty members are licensed perfusion technologists actively involved in the daily activities of the Department of Extracorporeal Services.

Physician Assistant Studies Program: Program Overview, Mission, Vision and Goals

Program Overview

The Master of Science in Physician Assistant Studies program is designed to provide students with an outstanding education in preparation for careers as general practice physician assistants, as well as to provide a foundation for leadership in an area of advanced clinical practice.

The innovative 33-month curriculum will utilize the extensive resources available at Rush University to provide its students with an excellent training experience.

- The 12-month didactic phase will include lecture, small group discussion, and case-based training to prepare students for clinical rotations.
- The unique, 21-month clinical training portion of the program prepares students to practice as primary care providers, while providing a one-of-a-kind immersion experience in an advanced clinical practice. Current areas for advanced clinical training include orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, interventional radiology, urology, neurosurgery, geriatrics, and physical medicine and rehabilitation.

Rush University is excited to offer this physician assistant (PA) training opportunity in our renowned medical facility. For more information about the program, visit the website at www.rushu.rush.edu/pa-program, contact the program via email at pa_admissions@rush.edu, or call (312) 563-3234.

Mission

The mission of the physician assistant program is to train qualified, advanced practice physician assistants to practice medicine with competence, professionalism, and compassion driven by academic excellence in scholarship and research, and a spirit of service to the community.

Vision

The Rush University Physician Assistant Program strives to be a nationally recognized leader in PA education, training highly qualified physician assistants to assume leadership roles in clinical and professional practice.

Goals

The goals of the Rush University Physician Assistant Studies program are to:

Prepare highly qualified physician assistants to take leadership roles in clinical practice, research, and service to the community and to the profession.

Provide enhanced training opportunities to students in various areas of clinical practice.

Prepare physician assistants who use best practice methods to plan, develop, and deliver high-quality, cost-effective health care services.

Promote research and scholarly activities as an integral part of effective medical practice.

The PA program is also dedicated to fulfilling the mission, vision and values of the University, the college and Rush University Medical Center.

Physician Assistant Studies Program: Admission Requirements

Admission to the PA program is competitive, and student selection is based on a number of factors such as overall strength of academic performance, type and quality of prior health care experience, prior experience working with or shadowing PAs and interpersonal communication skills. The program is rigorous, and academic preparedness will be assessed based on indicators such as general and science course grade point average, prerequisite coursework grade point average, coursework completed prior to application and performance on the Graduate Record Examination (GRE).

Requirements for admission into the PA program include:

- A bachelor's degree from an accredited college or university prior to matriculation into the program
- A minimum grade point average (GPA) of 3.0 on a 4.0 scale is required for both the total GPA and science GPA. A GPA greater than 3.3 for total and science is considered competitive.
- Graduate Record Examination (GRE) scores taken within five years prior to application submission. A minimal combined Verbal and Quantitative score of 1,000, or 302 in the new scoring system, is required for interview and admission consideration. A combined score of 1,200 and above, or 309 in the new scoring system, is considered very competitive.
- Original copies of GRE scores must be sent directly to Rush University. The PA Program GRE code is 0962.
- Documented hands-on, direct patient contact experience in a health care setting. Experience working with or shadowing PAs is required. A minimum of 1,000 hours of direct patient contact experience is required at the time of application submission. Having 2,500 hours and above is considered competitive.
- A completed application submitted to the Central Application Service for Physician Assistants (CASPA)
- A supplemental application and \$40 fee is required only if applicants are invited to interview at the program. Information regarding this will be provided with an interview invitation.
- An on-campus interview with members of the PA program faculty and admissions committee
- All applicants must meet the minimum requirements to perform the essential functions of a PA. See the Technical Standards section below for more information.
- Admission is contingent upon successful completion of health assessment, criminal background check and drug-screening processes prior to matriculation. Information regarding this requirement is discussed during interviews.
- Applicants with coursework or a bachelor's degree conferred outside of the United States must submit a course equivalence evaluation by either World Education Services (WES) or Educational Credential Evaluators (ECE).
- TOEFL scores, if English is not the applicant's native language
- The PA program admits students into the class on a rolling admission basis. This means that at each interview session,

offers are made to fill seats in the class. Under a rolling admissions process, it is possible to fill all the seats in the class before interviews are done. It is to the applicant's advantage to submit all application materials as early as possible.

- Attendance in the program is on a full-time basis only. Students entering the PA program must complete the curriculum in its entirety. No advanced standing or transfer credits will be awarded, regardless of previous professional or academic experience.
- Applications must be submitted online via CASPA . The CASPA application requires:
 - Submission of official transcripts for all college coursework completed
 - Three letters of recommendation. It is preferred that at least one of the letters be from a PA, physician or other health care provider familiar with the PA profession.
 - A personal statement
 - Payment of an application fee as outlined by CASPA

For inquiries related to the admissions process, contact CASPA directly.

For questions about the Rush University Physician Assistant Studies Program, call (312) 563-3234 or email pa_admissions@rush.edu.

Physician Assistant Studies Program: Required Prerequisites

The following courses must be completed prior to matriculation into the program. Advanced placement or CLEP courses are not accepted towards meeting prerequisite course requirements.

Candidates must have at least four of the required courses completed at the time of application submission.

Course grades of "C" or better are mandatory for all prerequisite courses. Courses with grades of "B" or better are considered competitive for admission consideration.

Professional Prerequisites	Minimum Semester Credit Hours
Human Anatomy	3
Human Physiology	3
OR a one- or two- course sequence combined Human Anatomy and Physiology course	(5 and above)
Biochemistry	3
Microbiology (with Lab preferred but not required)	3
Psychology or equivalent coursework in the behavioral sciences	3
Statistics	3
Total Minimum Semester Credit Hours	18 and above

It is strongly recommended that all courses be taken within seven years prior to application to the program.

The following prerequisite courses **MUST BE** taken within the past seven years prior to application to the program:

- Human Anatomy
- Human Physiology
- Biochemistry
- Microbiology

Physician Assistant Studies Program: Technical Standards

The following essential functions are required of all students enrolled in the Physician Assistant program.

Physician assistants (PAs) are responsible for the care of patients, some of who may be critically ill. PAs must be able to perform highly technical procedures and manage patients using complex medical equipment and devices. PAs must also be able to effectively and efficiently communicate with physicians and other health care professionals, as well as patients and their family members.

Therefore, in order to perform these tasks and be successful in the PA Studies program, all students should have the capacity to perform, or learn to perform, all of the following functions:

1. Effectively maneuver between examination rooms, office areas, clinic areas, hospital patient rooms, operating rooms, special procedure suites, and various other clinical areas in the hospital, clinic, and physician's office setting as required for proper patient care.
2. Move and position patients, and perform potentially physically demanding tasks, including cardiopulmonary resuscitation, as required in the clinical setting.
3. Communicate effectively with patients, family, physicians, and other health care workers in oral and written formats, and through the use of electronic medical records and email.
4. Assess and interpret information conveyed through diagnostic equipment and normal levels of speech from patients and staff, and respond to alarms.
5. Accurately measure medications, read patient records, evaluate information displayed on patient monitors, and make observations of patient condition.
6. Manipulate equipment as needed to perform fine motor tasks, examination techniques, and technical procedures as appropriate for the patient population and clinical setting.
7. Apply sufficient intellectual and emotional skills in order to plan and exercise independent judgment, perform patient assessment, problem solve, and respond quickly and appropriately to medical emergencies.

The program reserves the right to require applicants or students to demonstrate any of these essential functions as part of the technical standards for the program.

Physician Assistant Studies Program: Curriculum

Phase I: Core Didactic Program		Credit Hours
Quarter I: Summer		
PAS-510	Human Anatomy	7
PAS-511	Human Physiology	6
PAS-512	History and Physical Examination I	2
PAS-513	PA Professional Issues and Ethics	2
PAS-514	Diagnostic Methods I	2
Quarter II: Fall		
CHS-502	Research Methods and Statistics	5
GCC-520	Intro to Pharmacology and Physiology I	4
PAS-521	Clinical Medicine I	5
PAS-522	History and Physical Examination II	3
Quarter III: Winter		
GCC-521	Intro to Pharmacology and Physiology II	5
PAS-530	Microbiology and Infectious Disease	2
PAS-531	Clinical Medicine II	5
PAS-533	Clinical Diagnostic Reasoning	2
PAS-534	Diagnostic Methods II	2
PAS-535	Pediatrics	3
Quarter IV: Spring		
GCC-521	Intro to Pharmacology and Physiology II – ongoing from Winter	
CHS-510	Health Care in America	2
PAS-541	Clinical Medicine III	5
PAS-542	Fundamentals of Surgery	3
PAS-543	Psychosocial Medicine	2
PAS-545	Emergency Medicine	3
Quarter Hours for Phase I:		70

Phase II: Core Clinical Program (Typical Sequence)		Credit Hours
Quarter I: Summer		
PAS-581	Family Medicine	4
PAS-582	Internal Medicine	8
Quarter II: Fall		
PAS-583	General Surgery	8
PAS-584	Women's Health	4
Quarter III: Winter		
PAS-585	Pediatrics	8
PAS-586	Behavioral Health	4
PAS-587	Long-Term Care/Geriatrics	4
Quarter IV: Spring		
PAS-588	Emergency Medicine	4
PAS-589	Elective Rotation	4
PAS-580	Master's Research Project	2
Quarter Hours for Phase II:		50

Phase III: Clinical Specialization (Typical Sequence)		Credit Hours
Quarter I: Summer		
PAS-590	Advanced Clinical Practice	10
Quarter II: Fall		
PAS-590	Advanced Clinical Practice	10
Quarter III: Winter		
PAS-590	Advanced Clinical Practice	10
Quarter Hours for Phase III:		30
Total Quarter Hours for Program:		150

Research Administration: Goals

The College of Health Sciences at Rush University in Chicago is dedicated to academic excellence in teaching, research, service and patient care. The Research Administration Program is designed to prepare formally trained, advanced-level personnel for research administration leadership positions at colleges and universities, government agencies, hospitals and nonprofit agencies and in industry. The Master of Science in Research Administration (MSRA) Program will provide a unique online graduate education experience for current and future research administration professionals in all areas of research administration.

As a leadership program, the MSRA will provide graduates with the core competencies needed for practice as a research manager and provide the foundation needed to assume professional leadership roles in research administration.

Interaction with faculty, a practicum in research administration and a research paper are key elements of the program. The result is an outstanding education in research administration and a sense of personal growth toward becoming a leader in the research administration profession.

The Research Administration Program is designed to offer the student planned learning experiences and provide the knowledge and skills that will culminate in advancing in the research administration profession.

Outcomes

Graduates of the program will be prepared to function as leaders in the research administration profession.

Standards

- Upon completion of the program, all students will demonstrate the ability to comprehend and apply information relevant to the management of research administration.
- Upon completion of the program, all students will be familiar with all areas of research administration, and demonstrate proficiency in academic research methods and publish their findings in an academic research administration journal.
- Upon completion of the program, all students will demonstrate personal behaviors consistent with professional and employer expectations for a leader in the research administration profession.

In addition to these competency goals, the program seeks to:

- Provide a unique online graduate education experience for current and future research administration professionals in all areas of research administration.

- Provide students experience with research methods, data analysis and descriptive and inferential statistics in order to develop an understanding of how principal investigators design and perform research.
- Provide students with the tools to complete an investigational research project in their chosen area of specialization to be submitted for publication and/or formally presented at an appropriate professional meeting.
- Provide students with the core competencies needed for practice as a research manager and provide the foundation needed to assume professional leadership roles in research administration.

Research Administration: Program Overview

Online Program

The MSRA program will provide a unique online graduate education experience for current and future research administration professionals in all areas of research administration. The program is designed for working professionals and can be completed in 18 months by taking two courses a term.

Research Project

In addition to course work in various areas of research administration, students also learn research methods, data analysis and statistics. The goal is to develop the management skills necessary to evaluate current programs/protocols in research administration and to provide a data-driven basis for program changes and assessment. The students work with faculty to develop these skills in the context of a research project in their chosen area of specialization and write a capstone paper. Several of these projects have been submitted for publication and/or formally presented at an appropriate professional meeting, thus further advancing the profession of research administration. In addition to learning the management skills, this experience also provides an understanding of how principal investigators design and perform research and provides first-hand experience in study preparation and compliance issues. These experiences enable our graduates to identify areas where research administration practices can be modified to better enable the research community.

Practicum

The overall aim of practicum courses is to introduce students to the roles and responsibilities in the following research administrative offices: sponsored projects, clinical trials management, research finance, research compliance, research integrity,

departmental grant administration and intellectual property and technology transfer. In the first practicum, a student does a project in three of the above areas. Although a project is in a specified area, each project will involve learning skills and protocols that are applicable to multiple areas of research administration. Students are encouraged to select areas that are new to them. Students with experience in multiple areas may focus on completing a single project. The second practicum course is a way to gain experience in a specialized area. Because many of the students already have research administration experience, practicums are not required and electives may be taken in their place.

If you are a distance student who wishes to do a practicum, we will work with you to identify a practicum site either at your place of employment or near your home. We will work together to secure the necessary agreements with the site you identify and assure that the practicum meets the standards of our program. Due to varying state regulations, practicums may not be available to students in some states. In this case, we cannot offer a practicum. However, elective courses are available to all students in lieu of the practicums.

The Profession

The profession of research administration is an integral part of administration at universities and research institutes. The practice of the profession includes obtaining and overseeing external dollars for the institution, helping institutions comply with federal and nonfederal sponsor regulation, and developing partnerships and collaborative ventures with other research organizations. Research administrators represent their institutions in diverse matters related to grants and contracts as well as maintain the policies and procedures of their institution. The research administrator serves the faculty, the institution and the sponsoring agencies through an effective management system.

The sponsored research community often needs an advocate who will work toward improving and stimulating the institutional climate for these activities. As such, research administrators are often challenged to articulate the value of sponsored activity in an environment where it has not traditionally been emphasized. Research administrators also take on the role of policy developer when institutional policies and procedures may need adjustment to comply with sponsor requirements. At some institutions research administrators assume the role of facilitating the development of a climate more conducive to the research enterprise without compromising the teaching and public service missions of the institution.

The Program

The program will require a minimum of 46 quarter credit hours (13 courses) of academic coursework taken at the graduate level. All didactic courses will be completed using the Rush University learning management system (RULearning) for web-based instruction. The program may be completed in approximately 12 to 18 months of full-time enrollment or taken on a part-time basis over a longer period. Students who desire to complete additional elective courses offered either at Rush University or at another regionally accredited college or university may request to do so, and these electives may be incorporated into the student's program plan with the permission of the student's academic advisor.

The objectives of the program are to:

- Prepare competent advanced-level research administrators for practice
- Prepare leaders who are able to plan, develop and deliver high-quality, cost-effective research administration services
- Provide training in specific research administration areas
- Develop individuals who can formulate appropriate questions, organize and test hypotheses and apply research results to the practice of research administration

Research Administration: Admission Requirements

General Education Requirements

Prospective students must have a bachelor's degree or the equivalent from a U.S.-accredited college or university.

Courses in accounting, statistics, economics and computer applications strengthen a candidate's application. No prior work experience in the research administration field is required, although those with experience are encouraged to apply.

Admission Requirements

Although applications are accepted beginning in October for the next academic year, the start time is normally the fall quarter. Because class size is limited, students are encouraged to complete the application process as early as possible to ensure full consideration. Priority admission extends to April 1; applications continue to be reviewed after this date until the class is filled.

Candidates for the program should submit the following:

- Completed application form accompanied by a nonrefundable application fee of \$50
- Official transcripts from all colleges and universities attended

- Scores on the Graduate Record Examination or Graduate Management Aptitude Test (test must be taken with the last five years) (optional)
- Letters of recommendation (three letters are suggested)

Application Procedure

Application for admission into the Masters of Science in Research Administration should be made through the Rush RUApplying application. Prospective applicants may submit transcripts and a request for an unofficial evaluation to the Rush University Enrollment Services, 600 South Paulina Street, Suite 440, Chicago, Illinois 60612; phone number: (312) 942-7100.

The College of Health Sciences will interview applicants via telephone conference calls or in person.

Proficiency in English

All applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language examination (TOEFL). Applicants whose native language is not English and who have graduated from high school or successfully completed a higher education degree program (associate degree or higher) in the United States or one of its English-speaking protectorates **may petition for waiver of the TOEFL requirement** to the College of Health Sciences Dean's Office.

Waiver requests should include proof of receipt of a high school or college diploma from an accredited institution in the United States or one of its English-speaking protectorates. College or university degrees must be granted by a regionally accredited college or university to be considered for waiver of the TOEFL.

Year 1		Credit Hours
Fall Quarter		
RSA-501	Management Principles and Organizational Theory	4
RSA-502	Theory of Grants and Contracts Administration	4
Winter Quarter		
CHS-502	Research Design and Methods	5
RSA-510	Project Management	4
Spring Quarter		
RSA-512	Budgeting and Fiscal Management	4
CHS-501	Statistics	3
Summer Quarter		
	Elective (see below)	4
RSA-598A	Research Project I	2
Year 2		Credit Hours
Fall Quarter		
RSA-514	Legal, Ethical and Regulatory Compliance	4
RSA-598B	Research Project II	2
Winter Quarter		
RSA-598C	Research Project III	2
RSA-516	Intellectual Property and Technology Transfer	4
Spring Quarter		
	Elective (see below)	4
Hours Required for MS Degree:		46
Additional Courses (Electives)		Credit Hours and Term
RSA-596A	Practicum I	4 Summer
RSA-513	Introduction to Clinical Research Management	4 Summer
RSA-596B	Practicum II	4 Spring
RSA-518	Introduction to International Research Administration	4 Spring

Research Administration: Graduation Requirements

The minimum grade point average for advancement and graduation is 3.0.

Provisional or Probationary Status

All students in the Masters of Science in Research Administration Program must maintain a minimum cumulative grade point average of at least 3.0 (A = 4.0) and a quarter grade point average of at least 3.0 to maintain satisfactory academic status. If a student's grades fall below a quarter or cumulative GPA average of 3.0, or if a student receives a grade of "F" in any course, he or she will be placed on academic probation. A student on academic probation remains on probation until he or she has met the requirements established by the Student Progress and Promotion Committee for removal from academic probation.

Residency Requirements

This master's program is a distance learning program. The college expects that there will be a number of students from the State of Illinois, but residency in the State of Illinois is not required.

Research Requirements

The student enrolled in the Master of Science in Research Administration Program is required to complete a research paper in order to graduate as detailed in the program overview (above).

Qualifying or Comprehensive Examination Requirements

The capstone of the master's program will be the research project. Qualifying or comprehensive examinations are not required.

Time Limit for Program Completion

Students will be required to complete all coursework, including their research paper, within five years of enrollment in the MSRA program.

Respiratory Care: Program Overview

The Department of Respiratory Care in the College of Health Sciences at Rush University in Chicago is dedicated to clinical and academic excellence in teaching, research, service and patient care. The Respiratory Care Program is designed to provide students with an outstanding education in preparation for a satisfying professional career as advanced respiratory care

practitioners as well as to provide a foundation for leadership in management and supervision, education and clinical specialization.

Rush offers both BS and MS degrees in Respiratory Care. Prospective students have several degree and curriculum options to choose from to suit their life situations and yet achieve their goal to be a respiratory therapist.

Bachelor of Science Program

In addition to at least 60 semester hours (90 quarter hours) of general education and preprofessional prerequisite course requirements, the Bachelor of Science degree in Respiratory Care requires a minimum of 98 quarter hours of upper division credit for graduation. This program requires 29 semester hours of specific program preprofessional prerequisite requirements and 31 or more semester credits of general education prior to admission to Rush University for the professional phase (21 months). The preprofessional phase requirements may be completed at any accredited college or university. Dedicated to clinical and academic excellence, the professional phase includes more than 1,200 hours of in-hospital clinical practice. Additional elective coursework in management and education may be taken by students interested in these areas.

As a leadership program in respiratory care, this course of study aspires to provide graduates with the foundation needed to assume professional leadership roles in clinical practice, clinical specialty areas and management. Upon completion of the program, graduates are eligible for the national board examinations in respiratory care as well as state licensure.

Master of Science Program

The Master of Science degree in Respiratory Care requires a minimum of 117 quarter hours of credit for graduation. This is an integrated program, requiring 29 quarter hours of program preprofessional prerequisite requirements prior to admission to Rush University for the professional phase (21 months). The preprofessional phase requirements may be completed at any accredited college or university and include the successful completion of a baccalaureate degree. Dedicated to clinical and academic excellence, the professional phase includes more than 1,200 hours of in-hospital clinical practice.

As a leadership program in respiratory care, this course of study aspires to provide graduates with the foundation needed to assume professional leadership roles in clinical practice, clinical specialty areas, research, education and management. Upon completion of the program, graduates are eligible for the national board examinations in respiratory care as well as state licensure.

Respiratory Care: Admission Requirements — Bachelor's Program

Admission to the program is on a competitive basis. Student selection is based on a number of factors including overall grade point average, prerequisite grade point average, consistency of academic performance, coursework completed prior to application and interpersonal abilities. The program is rigorous, and applicants are required to arrange an orientation visit to a respiratory care department at a hospital prior to acceptance to the program if the applicant has no previous experience in the field of respiratory care. Requirements for admission to the professional phase of the program in respiratory care include:

- A minimum overall GPA of 2.5 in undergraduate coursework
- Completion of all professional prerequisite required courses with a grade of "C" or better
- Completion of Rush University Core Curriculum requirements*
- Ability to complete all core general education curriculum and program prerequisite courses by fall enrollment in the program. Students admitted to the three-year track or advanced standing programs may be admitted with some program prerequisites and/or general education outstanding.

- Junior standing at the time of application
- A personal interview with departmental faculty
- Completed application to the program and submission of official transcripts for all college coursework completed
- Ability to perform the essential functions of the job

* Total Rush Core Curriculum is 60 semester credit (90 quarter credit hours). Courses listed above will meet the core requirements (see General Education Requirements and Professional Prerequisites). Students entering the three-year track program may complete selected prerequisites during years one and two—see Three-Year Track Option.

Preprofessional Phase — Program Prerequisites

The preprofessional phase (lower-division college level coursework) requires a minimum of 60 quarter hours of prescribed study as outlined below.

General Education Requirements

Successful completion of general education coursework in mathematics (college algebra or above), communications, humanities and biological, social and behavioral sciences as outlined below:

	Semester Credit Hours	Quarter Credit Hours
Communications (English, composition)	6	8
Speech (oral communication)	3	4
Mathematics (college algebra or higher)	3	4
Humanities, Philosophy or Ethics	6	8
Fine arts (may not include a performance class)	3	4
Social and Behavioral Sciences (must include at least one course in psychology)	9	12
Elective courses in Communications, Humanities, Fine Arts, Philosophy, Ethics, Social Sciences, Life Sciences, Physical Sciences or Computer Science to total 60 semester credit hours for the core general education requirements for the College.	4	17
Total	34	57
Professional Prerequisites*	Semester Credit Hours	Quarter Credit Hours
Human Anatomy and Physiology (or 4 hours Anatomy and 4 hours Physiology)	8	10
Chemistry (with Lab)	4	5
Physics (with Lab)	4	5
Microbiology (with Lab)	4	5
Computer Science (includes computer literacy)	3	4
Statistics	3	4
Total	26	33

Respiratory Care: Admission Requirements — Master's Program

Admission to the program is on a competitive basis. Student selection is based on a number of factors including overall grade point average, prerequisite grade point average, consistency of academic performance, coursework completed prior to application, Graduate Record Examination (GRE) scores and interpersonal abilities. The program is rigorous, and applicants are required to arrange an orientation visit to a respiratory care department at a hospital prior to acceptance to the program if the applicant has no previous experience in the field of respiratory care.

Requirements for admission to the professional phase of the program in respiratory care include:

- A minimum overall GPA of 2.5 in undergraduate coursework
- Completion of all professional prerequisite required courses with a grade of "C" or better
- Completion of a bachelor's degree and the Rush University Core Curriculum requirements*
- Senior standing at the time of application and the ability to complete all preprofessional coursework by the beginning of the fall quarter of the first year. Students admitted to the three-year track or advanced standing programs may be admitted with some program prerequisites and/or general education outstanding.
- Submission of Graduate Record Examination (GRE) scores (from an examination taken within five years of the date of application to the program) is encouraged but not required.
- A personal interview with departmental faculty
- Completed application to the program and submission of official transcripts for all college coursework completed

* Total Rush Core Curriculum is 60 semester credit (90 quarter credit hours). Courses listed above will meet the core requirements (see General Education Requirements and Professional Prerequisites).

Program Prerequisites

All program prerequisite courses must be taken prior to entry into the first year of the regular professional program (alterations in the student's planned program require **written approval** by the department chair/program director). Registration for the first sequence of professional courses in the program requires:

- Admission into the program
- Completion of Human Anatomy and Physiology, Chemistry, Physics, Microbiology, Psychology, Computer Science and Statistics with a grade of "C" or better

- Consent of the Committee on Progress and Promotions for Respiratory Care

Please note: Individuals holding the RRT credential may be admitted to the program prior to completion of all program prerequisites.

Respiratory Care: Registered Respiratory Therapist Advanced Standing (RRT)

Admissions Requirements — BS or MS Program

Individuals holding the RRT credential may apply to enter the Respiratory Care Program prior to any quarter. Submission of an application for admission should be made to the Office of College Admission Services with all official transcripts, National Board for Respiratory Care (NBRC) RRT certificate and a personal interview at least 30 days prior to the first day of the quarter in which the individual desires to begin classes. General education and professional prerequisites must be completed prior to graduation. All other program policies and procedures apply.

Introduction

Individuals may have acquired academic credit in respiratory care courses from other schools and universities. Some individuals may acquire knowledge through experience and on-the-job training. When such persons apply for admission into the program, an attempt is made to grant academic credit for equivalent educational courses, equivalent knowledge acquired from experience and/or successful completion of the NBRC's certification and registry examinations.

All students graduating from the Respiratory Care Program must meet the same standards for graduation; the awarding of advanced standing does not signify a lesser-quality education than that offered through regular coursework. What it does, however, is attempt to exempt the student from those areas of the formal program where the student already has the knowledge and expertise in those skills that would be offered. The program has identified the minimum competencies that a respiratory therapist must have in order to provide safe, high-quality patient care. The identification of these competencies is a complex task, and a great deal of care must be taken to ensure a standard of excellence.

The following policies and procedures are designed to ensure that those individuals who receive advanced standing are qualified to do so, and that the screening process adheres to University as well as departmental policies at all times.

To allow individuals who are not qualified to receive advanced standing is not in the student's or the program's best interest.

Definition

Advanced standing is defined as a special and individually determined status granted to a student in a formal educational setting who has already gained, through other sources or through nonacademic experiences, knowledge, skills and professional attitudes taught in the program courses.

Purpose of Advanced Standing Procedures

The purpose of the advanced standing procedures is to recognize and give formal educational credit for knowledge and/or ability gained through previous training or experience.

Methods of Granting Advanced Standing

- Advanced standing can be awarded through transfer credit.
- Advanced standing can be awarded through the passing of an equivalency examination covering a certain area of knowledge. (An equivalency examination is an instrument or means by which a student accepted into the Respiratory Care Program can demonstrate mastery of a knowledge area, content area or skill and thus be exempted from a course in the program which teaches that area or skill.)
- Advanced standing can be awarded as credit for successful completion of national certification (CRT/CPFT) or registry examinations (RRT/RPFT).

Eligibility for Advanced Standing

- Transfer students (who have been accepted into the Rush University Respiratory Care Program) may receive transfer credit for equivalent courses within the Respiratory Care Program curriculum.
- Credentialed students (RRT, CRT, CPFT, RPFT) who have been accepted into the Rush University Respiratory Care Program may receive transfer credit and will also be eligible to take equivalency examinations in certain courses.

Policy for Transfer Students

Students who have completed coursework at other approved respiratory care programs may petition to have these courses transfer in lieu of specific coursework in the Rush University program. Students must submit a transcript of their courses from the program and a copy of the course syllabus for each course in which they desire transfer credit. The syllabus must contain the following: course objectives, lecture outlines, course content, evaluation procedures and related information. These courses will be evaluated on an individual basis for content and total contact hours and credit hours.

The department reserves the right to test the proficiency of any student in coursework transferred from other respiratory care

programs and the right to disallow transfer credit for such coursework in cases in which the student cannot demonstrate acceptable proficiency. All transfer credit is subject to the approval of the Committee on Progress and Promotions for Respiratory Care. The student must also have a minimum grade of "C" (2.0) for each course being transferred. A student cannot receive transfer credit for any respiratory care coursework if he or she left the previous program due to academic probation, suspension or exclusion. All University policies regarding transfer credit must be satisfied.

Policy for Individuals Who Hold the CRT or RRT Credential

Advanced standing is available to individuals who have successfully completed the National Board for Respiratory Care's respiratory therapy certification (CRT) or respiratory therapy registry (RRT) examinations. Those eligible for advanced standing must submit the following documentation:

- A notarized copy of the CRT or RRT certificate indicating that it is a true and accurate copy
- Official transcripts of all previous respiratory care and general education coursework attempted and/or completed
- A notarized copy of the Certificate of Completion from an approved respiratory care training program as applicable
- A completed application for admission to the program with advanced standing. These are available in the Admissions Office.
- A letter directed to the Committee on Progress and Promotions for Respiratory Care requesting advanced standing

Respiratory Care: Bachelor of Science Curriculum

Program Prerequisites

All program prerequisite courses must be taken prior to entry into the first year of the regular professional program (alterations in the student's planned program require written approval by the department chair/program director). Registration for the first sequence of professional courses in the program requires:

- Admission into the program
- Completion of Human Anatomy and Physiology, Chemistry, Physics, Microbiology, Psychology, Computer Science and Statistics with a grade of "C" or better
- Consent of the Committee on Progress and Promotions for Respiratory Care

Please note: Individuals holding the RRT credential may be admitted to the program prior to completion of all program prerequisites.

Professional Phase — Respiratory Care Professional Courses

Two-Year Track Option — BS Degree

Students accepted into the professional phase begin coursework in the fall quarter of the first year of the program.

Coursework in the professional phase is taken on a full-time basis in the following sequence:

Year 1		Credit Hours
Fall Quarter		
RC-311	Introduction to Respiratory Care	5
RC-312	Cardiopulmonary Physiology	5
RC-313	Respiratory Equipment and Techniques	5
CHS-510	Health Care in America	2
Winter Quarter		
RC-321	Patient Assessment	5
RC-322	Pulmonary Disease	5
RC-323	Mechanical Ventilation	4
RC-324	Pharmacology	3
Spring Quarter		
RC-331	Critical Care	5
RC-332	Cardiopulmonary Diagnostics and Pulmonary Function Testing	5
RC-333	Pediatric and Neonatal Respiratory Care	5
RC-334	Clinical Observation I	2
Summer Quarter		
RC-401	Education*	5
RC-402	Management*	5
RC-403	Introduction to Research*	5
RC-404	Clinical Observation II	2
*Electives		
Year 2		Credit Hours
Fall Quarter		
RC-411	Clinical Practice I	12
RC-412	Clinical Seminar I	3
Winter Quarter		
RC-421	Clinical Practice II	12
RC-422	Clinical Seminar II	3
Spring Quarter		
RC-431	Clinical Practice III	12
RC-432	Clinical Seminar III	3
Total Hours Required for Respiratory Care		98–108

Three-Year Track Option — BS Degree

The three-year track option of the professional phase is available to prospective students who still need to complete one or two of the program prerequisites, or who wish to take a reduced course load due to work or family obligations. In order to be eligible for this track, students must complete 50 of the required 60 semester hours of program prerequisites prior to enrolling in the Respiratory Care Program. The student may then complete

the remaining program prerequisites during year one and two of the three-year track. It is highly recommended that anatomy and physiology be completed before starting any track.

The professional coursework begins in the fall quarter of the first year of the program on a part-time basis. Coursework on the three-year track is taken on a part-time basis for years one and two and on a full-time basis for year three in the following sequence:

Year 1		Credit Hours
Fall Quarter		
RC-312	Cardiopulmonary Physiology	5
IDS-510	Health Care in America	2
Winter Quarter		
RC-322	Pulmonary Disease	5
RC-324	Pharmacology	3
Spring Quarter		
RC-332	Cardiopulmonary Diagnostics and Pulmonary Function Testing	5
	Elective (Ethics, Statistics)	2
Summer Quarter		
RC-401	Education*	5
RC-402	Management*	5
TOTAL		10
Year 2		Credit Hours
Fall Quarter		
RC-311	Introduction to Respiratory Care	5
RC-313	Respiratory Equipment and Techniques	5
Winter Quarter		
RC-321	Patient Assessment	5
RC-323	Mechanical Ventilation	4
Spring Quarter		
RC-331	Critical Care	5
RC-333	Pediatric and Neonatal Respiratory Care	5
RC-334	Clinical Observation I	2
Summer Quarter		
RC-603	Introduction to Research*	5
RC-404	Clinical Observation II	2
TOTAL		7
Year 3		Credit Hours
Fall Quarter		
RC-411	Clinical Practice I	12
RC-412	Clinical Seminar I	3
Winter Quarter		
RC-421	Clinical Practice II	12
RC-422	Clinical Seminar II	3
Spring Quarter		
RC-431	Clinical Practice III	12
RC-432	Clinical Seminar III	3
Total Hours Required for Respiratory Care		98-108

*Electives

Respiratory Care: RRT Advanced Standing Curriculum for Bachelor of Science

Credit Based on the RRT Credential

Individuals providing documentation that they hold the RRT credential will receive credit for the following theory courses:

RC-313	Respiratory Care Equipment and Techniques	5
RC-311	Introduction to Respiratory Care	5
RC-324	Pharmacology	3
RC-321	Patient Assessment	5
RC-411	Clinical Practice I	12
RC-421	Clinical Practice II	12
RC-334	Clinical Observation I	2
RC-404	Clinical Observation II	2
RC-412	Clinical Seminar I	3
RC-999	Ungraded Credit	14
TOTAL		63

Required Courses

The RRT Student must enroll in and complete the following required courses:

RC-402	Management	5
RC-401	Education	5
RC-403	Introduction to Research	5
RC-431	Clinical Practice III	12
RC-413	Research Project I	2
RC-423	Research Project II	2
RC-433	Research Project III	2
RC-432	Clinical Seminar III	3
TOTAL		36

Elective Courses

The RRT student must select a minimum of nine quarter hours from the following courses.

RC-312	Cardiopulmonary Physiology	5
RC-322	Pulmonary Disease	5
RC-323	Mechanical Ventilation	4
RC-332	Cardiopulmonary Diagnostics and Pulmonary Function Testing	5
RC-331	Critical Respiratory Care	5
RC-333	Pediatric and Neonatal Respiratory Care	5
CHS-510	Health Care in America	2
TOTAL		31

Total credit awarded based on the RRT Credential	63
Credit hours that must be completed at Rush	45
Total respiratory care course hours required for the degree	98–108

Sample Advanced Standing Program Student Schedule:

Summer Quarter		
RC-401	Education	5
RC-402	Management	5
RC-403	Research	5
Fall Quarter		
CHS-510	Health Care in America	2
RC-413	Research Project I	2
Winter Quarter		
RC-322	Pulmonary Disease	5
RC-423	Research Project II	2
Spring Quarter		
RC-331	Critical Care	5
RC-433	Research Project III	2
RC-432	Clinical Seminar III	3
Summer Quarter		
RC-431	Clinical Practice III	12

Note regarding RC-431, Clinical Practice III: The purpose of this clinical practice will be to allow the student to acquire special clinical skills and/or expertise that is not normally achieved in an associate degree program or through work experience. The student may also use this course to refine or upgrade clinical skills that may have been used infrequently due to the nature of the student's work environment or experiences. A course proposal or prospectus for clinical will be designed by the student and submitted to the Director of Clinical Education. The prospectus or proposal must be reviewed and approved by the Committee on Progress and Promotion for Respiratory Care. The prospectus must include course goals and objectives; methodology to achieve these goals and objectives to include clinical or laboratory facilities to be utilized; time spent in a given clinical or laboratory area; and proposed method of evaluation. Areas of concentration which may be included are:

- Pulmonary Function Laboratory
- Cardiac and/or Pulmonary Stress Testing
- Diagnostic Sleep Laboratory
- Fiberoptic Bronchoscopy

- Physiologic Monitoring to include Hemodynamics
- Adult Critical Care
- Pediatric and/or Neonatal Respiratory Care
- ECMO
- Mechanical Circulatory Assistance
- Respiratory Home Care
- Sub-Acute/Long-Term Care Facilities
- Pulmonary and/or Cardiac Rehabilitation
- Invasive and/or Noninvasive Cardiology
- Hyperbaric Medicine
- Applied Research
- Respiratory Care Education
- Management
- Advanced Generalist (to include two or more subspecialties)

With the program director's permission, this 12-hour course (RC-431) may be divided into two parts—RC-431A (6 hours)

and RC-431B (6 hours)—accomplishing the same course goals outlined above over two quarters.

Substitutions for the above courses to meet individual student needs may be made from other respiratory care curriculum coursework if approved by the program director.

Students who desire additional coursework related to supervision and management may request that specific courses taken at the graduate level in another Rush University department be substituted for specific required or elective courses.

Summary of Requirements for the BS Degree for RRT Students:

Respiratory care required courses	45
Credit based on RRT credential	63
TOTAL	108

Respiratory Care: Master of Science Curriculum

Preprofessional Phase — Program Prerequisites

The preprofessional phase (lower-division college-level coursework) requires a minimum of 29 quarter hours of prescribed study as outlined below.

General Education Requirements

Successful completion of a bachelor's degree to include general education coursework in mathematics (college algebra or above), communications, humanities, and social and behavioral sciences as outlined below:

	Semester Credit Hours	Quarter Credit Hours
Communications (English, composition)	6	9
Mathematics (college algebra or higher)	3	3
Humanities, Fine Arts, Philosophy or Ethics (may not include a performance class)	6	6
Elective courses in Communications, Humanities, Fine Arts, Philosophy, Ethics, Social Sciences, Life Sciences, Physical Sciences or Computer Science to total 60 semester credit hours for the core general education requirements for the College	16	43
Total	31	61
Professional Prerequisites*	Semester Credit Hours	Quarter Credit Hours
Human Anatomy and Physiology (or 4 hours Anatomy and 4 hours Physiology)	8	8
Chemistry (with Lab)	4	4
Physics (with Lab)	4	4
Microbiology (with Lab)	4	4
Psychology (courses with prefixes PSYC)	3	3
Computer Science (includes computer literacy)	3	3
Statistics	3	3
Total	29	29

Professional Phase — Respiratory Care

Professional Courses

Two-Year Track Option — MS Degree

Students accepted into the professional phase begin coursework in the fall quarter of the first year of the program. Coursework in the professional phase is taken on a full-time basis in the following sequence:

Year 1		Credit Hours
Fall Quarter		
RC-511	Introduction to Respiratory Care	5
RC-512	Cardiopulmonary Physiology	5
RC-513	Respiratory Equipment and Techniques	5
CHS-510	Health Care in America	2
Winter Quarter		
RC-521	Patient Assessment	5
RC-522	Pulmonary Disease	5
RC-523	Mechanical Ventilation	4
RC-524	Pharmacology	3
Spring Quarter		
RC-531	Critical Care	5
RC-532	Cardiopulmonary Diagnostics and Pulmonary Function Testing	5
RC-533	Pediatric and Neonatal Respiratory Care	5
RC-534	Clinical Observation I	2
Summer Quarter		
RC-561	Education	5
RC-562	Management	5
RC-563	Introduction to Research	5
RC-564	Clinical Observation II	2
Year 2		Credit Hours
Fall Quarter		
RC-571	Clinical Practice I	12
RC-572	Clinical Seminar I	3
RC-573	Research Project I	2
Winter Quarter		
RC-581	Clinical Practice II	12
RC-582	Clinical Seminar II	3
RC-583	Research Project II	2
Spring Quarter		
RC-591	Clinical Practice III	12
RC-592	Clinical Seminar III	3
RC-593	Research Project III	2
Total Hours for Respiratory Program:		119

Three-Year Track Option — MS Degree

two of the program prerequisites or wish to take a reduced course load due to work or family obligations. In order to be eligible for this track, students must complete 50 of the required 60 semester hours of program prerequisites prior to enrolling in the Respiratory Care Program. The student may then complete the remaining program prerequisites during year one and two of

the three-year track. It is highly recommended that anatomy and physiology be completed before starting any track.

The professional coursework begins in the fall quarter of the first year of the program on a part-time basis. Coursework on the three-year track is taken on a part-time basis for years one and two and on a full-time basis for year three in the following sequence:

Year 1		Credit Hours
Fall Quarter		
RC-512	Cardiopulmonary Physiology	5
CHS-510	Health Care in America	2
Winter Quarter		
RC-522	Pulmonary Disease	5
RC-524	Pharmacology	3
Spring Quarter		
RC-532	Cardiopulmonary Diagnostics and Pulmonary Function Testing	5
	Elective	5
Summer Quarter		
RC-561	Education	5
RC-562	Management	5
Year 2		Credit Hours
Fall Quarter		
RC-511	Introductory to Respiratory Care	5
RC-513	Respiratory Equipment and Techniques	5
Winter Quarter		
RC-521	Patient Assessment	5
RC-523	Mechanical Ventilation	5
Spring Quarter		
RC-531	Critical Care	5
RC-533	Pediatric and Neonatal Respiratory Care	5
RC-534	Clinical Observation I	2
Summer Quarter		
RC-563	Introduction to Research	5
RC-564	Clinical Observation II	2
Year 3		Credit Hours
Fall Quarter		
RC-571	Clinical Practice I	12
RC-572	Clinical Seminar I	3
RC-573	Research Project I	2
Winter Quarter		
RC-581	Clinical Practice II	12
RC-582	Clinical Seminar II	3
RC-583	Research Project II	2
Spring Quarter		
RC-591	Clinical Practice III	12
RC-592	Clinical Seminar III	3
RC-593	Research Project III	2
Total Hours for Respiratory Care Program		123-125

Respiratory Care: RRT Advanced Standing Curriculum for Master of Science

Credit Based on the RRT Credential

Individuals providing documentation that they hold the RRT credential may receive credit for the following theory courses:

RC-513	Respiratory Care Equipment and Techniques	5
RC-511	Introduction to Respiratory Care	5
RC-524	Pharmacology	3
RC-521	Patient Assessment	5
RC-571	Clinical Practice I	12
RC-572	Clinical Seminar I	3
RC-581	Clinical Practice II	12
RC-582	Clinical Seminar II	3
RC-999	Ungraded Credit	26
TOTAL		74

Required Courses

The RRT student must enroll in and complete the following required courses:

RC-562	Management	5
RC-561	Education	5
RC-563	Introduction to Research	5
RC-591	Clinical Practice III	12
RC-573	Research Project I	2
RC-583	Research Project II	2
RC-593	Research Project III	2
RC-592	Clinical Seminar III	3
TOTAL		36

Elective Courses

The RRT student must select a minimum of nine quarter hours from the following courses:

RC-512	Cardiopulmonary Physiology	5
RC-522	Pulmonary Disease	5
RC-523	Mechanical Ventilation	4
RC-532	Cardiopulmonary Diagnostics and Pulmonary Function Testing	5
RC-531	Critical Respiratory Care	5
RC-533	Pediatric and Neonatal Respiratory Care	5
CHS-510	Health Care in America	2
TOTAL		31

Total credit which may be awarded based on the RRT Credential	74
Credit hours that must be completed at Rush	45
Total respiratory care course hours required for the degree	119

Sample Advanced Standing Program Student Schedule:

Summer Quarter		
RC-561	Education	5
RC-562	Management	5
RC-563	Introduction to Research	5
Fall Quarter		
CHS-510	Health Care in America	2
RC-512	Cardiopulmonary Physiology	5
RC-573	Research Project I	2
Winter Quarter		
RC-522	Pulmonary Disease	5
RC-583	Research Project II	2
Spring Quarter		
RC-531	Critical Care	5
RC-593	Research Project III	2
RC-592	Clinical Seminar III	3
Summer Quarter		
RC-591	Clinical Practice III	12

Note regarding RC-591, Clinical Practice III: The purpose of this clinical practice will be to allow the student to acquire special clinical skills and/or expertise that is not normally achieved in an associate's degree program or through work experience. The student may also use this course to refine or upgrade clinical skills which may have been used infrequently due to the nature of the student's work environment or experiences. A course proposal or prospectus for clinical practice will be designed by the student and submitted to the Director of Clinical Education. The prospectus or proposal must be reviewed and approved by the Committee on Progress and Promotion for Respiratory Care. The prospectus must include course goals and objectives; methodology to achieve these goals and objectives to include clinical or laboratory facilities to be utilized; time spent in a given clinical or laboratory area; and proposed method of evaluation. Areas of concentration which may be included are:

- Pulmonary Function Laboratory
- Cardiac and/or Pulmonary Stress Testing

- Diagnostic Sleep Laboratory
- Fiberoptic Bronchoscopy
- Physiologic Monitoring to include Hemodynamics
- Adult Critical Care
- Pediatric and/or Neonatal Respiratory Care
- ECMO
- Mechanical Circulatory Assistance
- Respiratory Home Care
- Subacute/Long-Term Care Facilities
- Pulmonary and/or Cardiac Rehabilitation
- Invasive and/or Noninvasive Cardiology
- Hyperbaric Medicine
- Applied Research
- Respiratory Care Education
- Management
- Advanced Generalist (to include two or more subspecialties)

With the program director's permission, this 12-hour course (RC-591) may be divided into two parts—RC-591A (6 hours) and RC-591B (6 hours)—accomplishing the same course goals outlined above over two quarters.

Substitutions for the above courses to meet individual student needs may be made from other respiratory care curriculum coursework if approved by the program director.

Students who desire additional coursework related to supervision and management may request that specific courses taken at the graduate level in another Rush University department be substituted for specific required or elective courses.

Summary of Minimum Requirements for the MS Degree for RRT Students Holding a Bachelor's Degree

Respiratory care required courses	45
Credit based on RRT credential	74
TOTAL	119

Respiratory Care: Academic Policies

Bachelor of Science

All professional courses (RC-prefix) in the department are taught in a sequential manner. Each professional course in the program serves as the prerequisite for the subsequent course. Consequently, professional courses must be taken in sequence. Withdrawing or failure to successfully complete a professional course with a letter grade of "C" or better may result in the student being placed on the three-year track, given a leave of absence (LOA) and academic probation, or dismissed from the program after review by the Committee on Progress and Promotions. Students readmitted to the program at times other than the fall quarter of the second year will pick up the course sequence as prescribed by the chair/program director or Committee on Progress and Promotions for Respiratory Care.

Standards of Performance for Respiratory Care and Major Field-Related Courses

90–100 = A

80–89 = B

75–79 = C

70–74 = D

Below 70 = F

Unless otherwise described in a given course syllabus, the minimum satisfactory grade for course credit is a letter grade of "C," and all stipulated segments of a course must be passed by this standard. Students must demonstrate proficiency in all clinical skills presented in order to pass clinical courses. For all clinical courses, the final exam must be passed at the designated cut score and a grade of "C" or better must be maintained in order to successfully complete each clinical course to continue in the program.

Students are expected to maintain an overall GPA in the program of at least 2.0.

Failure of the student to maintain a cumulative GPA of at least 2.0 will subject the student to a review and may result in the student being placed on probation, given a LOA or dismissed from the program after review by the Committee on Progress and Promotions.

If a dismissed student wishes to reenter the program, he or she must reapply and will be considered on the same basis as any new applicant. Students who voluntarily withdraw from the program either passing or failing have no guarantee of reinstatement to the program. Students requesting readmission to the

program should submit a letter to that effect to the Committee on Progress and Promotions for Respiratory Care. Students readmitted to the program will pick up the course sequence as prescribed by the chair/program director or Committee on Progress and Promotions for Respiratory Care.

The three-year track option may be used to remediate students that fail to earn at least a grade of "C" in each respiratory care course or maintain an overall GPA of at least 2.0. While on this three-year track, withdrawing or failure to complete a respiratory care professional course with a letter grade of "C" or better may result in the student being placed on academic probation, given a LOA or dismissed from the program after review by the Committee on Progress and Promotions.

Clinical Final Examinations

All students are required to pass the clinical final examination after completing the clinical course to continue in the program. In the event a student fails the clinical final examination, the student is allowed to make ONE more attempt to pass. In the event the student passes the clinical final exam on the second attempt, the student will continue in the program. The grade earned on the first attempt will be used to calculate the final clinical grade. In the event the student does NOT pass the clinical final exam on the second attempt, the student will be placed in remediation. The student will be given a third attempt to pass the final by the end of the next quarter. In the event the student does not pass on the third attempt, the student will earn an "F" in the clinical course and may be suspended or released from the program.

Comprehensive End-of-Program Competency Assessment Examination

Before graduating, the student will successfully pass the Self-Assessment Examination (SAE) therapist multiple choice examination and SAE clinical simulation examination (CSE). The SAE therapist multiple choice examination will be taken during the winter session of the second year as a part of RC-421, Clinical Practice II. The SAE clinical simulation examination (CSE) will be taken during the spring session of the second year as a part of RC-431, Clinical Practice III. Passing scores on both examinations are required to successfully complete RC-421 and 431. Students who do not successfully complete these examinations will receive an Incomplete ("I") for RC-421 and 431 and will retake the examinations. Those failing the examination twice may be enrolled in RC-421 or 432 as a directed Independent Study for remediation. Those failing the examination after multiple attempts will be subject to dismissal from the program. Those students may reapply to the program (see Procedures for Readmission).

Conduct and Ethics

Students are expected to conduct themselves at all times in a dignified manner. This manner conforms to the ethics of the profession and instills patient confidence in one's abilities as a health care practitioner. Each student is expected to conform to the professional code of ethics as outlined in the student handbook and policies outlined in the University catalog.

Irresponsible, unprofessional or unethical behavior as determined by the instructor or failure to follow the instructions of a clinical instructor during clinical practice may result in dismissal from the program. All hospital regulations are to be followed by students when undergoing clinical training in a facility.

Scholastic Dishonesty and Cheating

The department will not condone cheating in any form. Plagiarizing or copying others' writing or work is considered cheating. Any allegations of cheating will be reviewed by the Committee on Progress and Promotions for Respiratory Care and, if merited, dealt with in a strict manner, including immediate dismissal from the program.

Any student found to be cheating on an examination, test, quiz or assignment will automatically receive a "0" for the grade and will be subject to dismissal from the program at the discretion of the Committee on Progress and Promotions for Respiratory Care. Failure to report incidents involving scholastic dishonesty on the part of another student will be considered unprofessional conduct on the part of the student and may result in disciplinary action.

Examination Administration

All examinations given by the department will be monitored by faculty or staff at all times. Students will be seated in such a manner as to minimize the opportunity for observation of other students' examination papers. No breaks will be allowed once an examination period has begun, and students may not leave the room during an exam until they are finished taking the examination, except in the event of an emergency, which will be judged by the faculty or staff monitoring the exam on a case by case basis.

If a student turns in an examination without answering all questions, he or she will NOT be given an opportunity to finish the examination after leaving the room.

Only marks made on the Scantron sheet will be used to compute a grade on all Scantron-graded examinations. Even if a student marks the answer correctly on his or her examination, but does not mark it correctly on the Scantron, only the Scantron answer will be used to compute the grade, not the answer marked on the examination.

Programmable calculators will NOT be allowed during examinations.

Examination Review

At the discretion of the course instructor, during review of any examination given within the curriculum, no other papers or books will be allowed on the student's desk. No writing implements of any kind will be allowed. NO note taking or recording of any kind will be permitted. This includes written note-taking and/or recording with audiotape, videotape or any other form of electronic or mechanical recording. Violation of this policy will constitute academic dishonesty and will be referred to the Committee on Progress and Promotions for review and possible disciplinary action.

Master of Science

All professional courses (RC-prefix) in the department are taught in a sequential manner. Each professional course in the program serves as the prerequisite for the subsequent course. Consequently, professional courses must be taken in sequence. Withdrawing or failure to successfully complete a professional course with a letter grade of "C" or better may result in the student being placed on the three-year track, given a leave of absence (LOA) and academic probation or dismissed from the program after review by the Committee on Progress and Promotions. Students readmitted to the program at times other than the fall quarter of the second year will pick up the course sequence as prescribed by the chair/program director or Committee on Progress and Promotions for Respiratory Care.

Standards of Performance for Respiratory Care and Major Field-Related Courses

90–100 = A

80–89 = B

75–79 = C

70–74 = D

Below 70 = F

Unless otherwise described in a given course syllabus, the minimum satisfactory grade for course credit is a letter grade of "C" and all stipulated segments of a course must be passed by this standard. Students must demonstrate proficiency in all clinical skills presented in order to pass clinical courses. For all clinical courses, the final exam must be passed at the designated cut score AND a grade of "C" or better must be maintained in order to successfully complete each clinical course to continue in the program.

Students are expected to maintain an overall GPA in the program of at least 3.0.

Failure of the student to maintain a cumulative GPA of at least 3.0 will subject the student to a review and may result in the student being placed on probation, given a LOA or dismissed from the program after review by the Committee on Progress and Promotions.

If a dismissed student wishes to reenter the program, he or she must reapply and will be considered on the same basis as any new applicant. Students who voluntarily withdraw from the program, either passing or failing, have no guarantee of reinstatement to the program. Students requesting readmission to the program should submit a letter to that effect to the Committee on Progress and Promotions for Respiratory Care. Students readmitted to the program will pick up the course sequence as prescribed by the chair/program director or Committee on Progress and Promotions for Respiratory Care.

The three-year track option may be used to remediate students that fail to earn at least a grade of "C" in each respiratory care course or maintain an overall GPA of at least 3.0. While on this three-year track, withdrawing or failure to complete a respiratory care professional course with a letter grade of "C" or better may result in the student being placed on academic probation, given a LOA or dismissed from the program after review by the Committee on Progress and Promotions.

Clinical Final Examinations

All students are required to pass the clinical final examination after completing Clinical course to continue in the program. In the event a student fails the clinical final examination, the student is allowed to make ONE more attempt to pass. In the event the student passes the clinical final exam on the second attempt, the student will continue in the program. The grade earned on the first attempt will be used to calculate the final clinical grade. In the event the student does NOT pass the clinical final exam on the second attempt, the student will be placed in remediation. The student will be given a third attempt to pass the final by the end of the next quarter. In the event the student does not pass on the third attempt, the student will earn an "F" in the clinical course and may be suspended or released from the program.

Comprehensive End-of-Program Competency Assessment Examination

Before graduating, the student will successfully pass the Self-Assessment Examination (SAE) therapist multiple choice examination and SAE clinical simulation examination (CSE). The

SAE therapist multiple choice examination will be taken during the winter session of the second year as a part of RC-581, Clinical Practice II. The SAE clinical simulation examination (CSE) will be taken during the spring session of the second year as a part of RC-591, Clinical Practice III. Passing scores on both examinations are required to successfully complete RC-581 and 591. Students who do not successfully complete these examinations will receive an Incomplete ("I") for RC-581 and 591 and will retake the examinations. Those failing the examination twice may be enrolled in RC-581 or 591 as a directed Independent Study for remediation. Those failing the examination after multiple attempts will be subject to dismissal from the program. Those students may reapply to the program (see Procedures for Readmission).

Conduct and Ethics

Students are expected to conduct themselves at all times in a dignified manner. This manner conforms to the ethics of the profession and instills patient confidence in one's abilities as a health care practitioner. Each student is expected to conform to the professional code of ethics as outlined in this handbook and policies outlined in the University catalog.

Irresponsible, unprofessional or unethical behavior as determined by the instructor or failure to follow the instructions of a clinical instructor during clinical practice may result in dismissal from the program. All hospital regulations are to be followed by students when undergoing clinical training in a facility.

Scholastic Dishonesty and Cheating

The department will not condone cheating in any form. Plagiarizing or copying others' writing or work is considered cheating. Any allegations of cheating will be reviewed by the Committee on Progress and Promotions for Respiratory Care and, if merited, dealt with in a strict manner, including immediate dismissal from the program.

Any student found to be cheating on an examination, test, quiz or assignment will automatically receive a "0" for the grade and will be subject to dismissal from the program at the discretion of the Committee on Progress and Promotions for Respiratory Care. Failure to report incidents involving scholastic dishonesty on the part of another student will be considered unprofessional conduct on the part of the student and may result in disciplinary action.

Examination Administration

All examinations given by the department will be monitored by faculty or staff at all times. Students will be seated in such a manner as to minimize the opportunity for observation of other

students' examination papers. No breaks will be allowed once an examination period has begun, and students may not leave the room during an exam until they are finished taking the examination, except in the event of an emergency, which will be judged by the faculty or staff monitoring the exam on a case by case basis.

If a student turns in an examination without answering all questions, he or she will NOT be given an opportunity to finish the examination after leaving the room.

Only marks made on the Scantron sheet will be used to compute a grade on all Scantron-graded examinations. Even if a student marks the answer correctly on his or her examination, but does not mark it correctly on the Scantron, only the Scantron answer will be used to compute the grade, not the answer marked on the examination.

Programmable calculators will NOT be allowed during examinations.

Examination Review

At the discretion of the course instructor, during review of any examination given within the curriculum, no other papers or books will be allowed on the student's desk. No writing implements of any kind will be allowed. NO note-taking or recording of any kind will be permitted. This includes written note-taking and/or recording with audiotape, videotape or any other form of electronic or mechanical recording. Violation of this policy will constitute academic dishonesty and will be referred to the Committee on Progress and Promotions for review and possible disciplinary action.

Respiratory Care: Graduation Requirements — Bachelor of Science

- Completion of all required coursework with a grade point average of 2.0 or better
- Completion of each required respiratory care professional course with a grade of "C" or better
- Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Support (PALS), and Neonatal Resuscitation Provider (NRP) course completion
- Completion of all University requirements for graduation

Respiratory Care: Graduation Requirements — Master of Science

- Completion of all required coursework with a grade point average of 3.0 or better
- Completion of each required respiratory care professional course with a grade of “C” or better
- Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Support (PALS), and Neonatal Resuscitation Provider (NRP) course completion
- Successful completion of a departmental research project
- Completion of all University requirements for graduation

Vascular Ultrasound and Technology: Mission and Goals

Mission

The mission of the Vascular Ultrasound and Technology Program is to improve the quality and availability of diagnostic vascular ultrasound examinations for patients by educating students in the knowledge, skills and behavior necessary to competently perform vascular ultrasound examinations.

Goals

The primary goal of the program is to prepare competent entry-level vascular technologists in the cognitive (knowledge), psychomotor (skills) and affective (behavior) competencies necessary to perform vascular ultrasound examinations. A secondary goal is to offer a broader understanding of the profession to the students through basic education in laboratory management, professional practice and research areas.

Vascular Ultrasound and Technology: Overview

Description of the Profession

The vascular sonographer plays a vital role in the diagnosis and treatment of patients with disorders of arteries and veins. These include atherosclerosis that may result in strokes or gangrene of the extremities, blood clots in veins that may break off and travel to the lungs and possibly cause death, aneurysms that may burst and many other pathologies of the circulatory system. A vascular sonographer is responsible for taking the patient’s history; performing the appropriate test using high-tech, noninvasive equipment such as ultrasound; documenting and

analyzing the data and images; and preparing a preliminary report for the physician to interpret. The sonographer has extensive direct interaction with patients, physicians, coworkers and other hospital personnel. The work requires physical, intellectual and communication skills.

Program Description

Students in the Vascular Ultrasound and Technology Program are taught by vascular sonographers and physicians who are experienced practitioner-teachers in the field. The basic program is full-time and consists of 21 months (seven quarters) of study. The first three quarters consist of nine months of classroom instruction, student laboratory work and observation of patient examinations. The second-year students perform the vascular examinations learned during the first year on patients under the direction of credentialed and experienced vascular sonographers at two or more vascular laboratories during the year. The clinical sites include the university hospitals in Chicago as well as some community hospitals and out-of-state sites. During the second year, students also participate in senior lectures, patient case presentations and vascular conference. Students earn a Bachelor of Science degree and are eligible to take the certification examination in vascular ultrasound after graduation.

Program Accreditation

The Vascular Ultrasound Program is accredited by the Commission on Accreditation of Allied Health Educational Programs (CAAHEP) at 1361 Park St., Clearwater, FL 33756, and www.caahep.org (phone 727-210-2350) through the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS).

Vascular Ultrasound and Technology: Admission Requirements

- A minimum of 90 quarter (60 semester) hours earned at an accredited college or university is required.
- The minimum cumulative GPA is 2.50 on a 4.0 scale. However, more than 90% of students admitted in the previous two years had a cumulative incoming GPA over 2.75.
- Bachelor of Science Degree Minimum Core General Education Requirements: Effective January 1, 2009, all entering students must complete the following core general education requirements with a minimum grade of a “C” in order to be eligible for the Bachelor in Science degree awarded by Rush University:

Requirements	Semester Credit Hours	Quarter Credit Hours
Two courses in COMMUNICATION English composition is required. The second course may be in composition, speech, or other communication topic.	6	9
One course in MATHEMATICS College algebra or higher-level math is required. More math courses are highly recommended.	3	4
Two courses in LIFE SCIENCES Human anatomy and physiology is required. (Two semesters are highly recommended.) The second course may be in anatomy, biology, microbiology, pathophysiology, physiology or other life science topic.	6	9
One course in PHYSICAL SCIENCES General physics is required. Chemistry is highly recommended. Please be sure to fulfill this requirement by taking a physics course that is for science majors. For further information please see our website at www.rushu.rush.edu/vastech .	3	4
One course in SOCIAL SCIENCES (i.e., government, history, political science, psychology, sociology)	3	4
One course in HUMANITIES (i.e. ethics, fine arts, literature, philosophy) Ethics is highly recommended. Performance courses do not meet this requirement.	3	4
Elective courses in communications, computer science, ethics, fine arts, humanities, life sciences, literature, philosophy, physical sciences or social sciences to total 36 semester (56 quarter) hours.	36	56
Total	60	90

- Applicants who have taken their prerequisite coursework at a university outside the United States must have their coursework evaluated by the Educational Credential Evaluators (ECE).
- Three recommendations are required on the recommendation forms provided in the application. These recommendations should be from previous instructors and employers (preferably from two instructors and one employer).

Vascular Ultrasound and Technology: Technical Standards

The purpose of this document is to advise potential students of the functional expectations of the Vascular Ultrasound and Technology student during the program's classes, labs and clinical rotations. Students must:

Observation

- Have sufficient eyesight to observe details in black and white as well as color images, observe patients, equipment monitors, equipment controls and paperwork with easy transition from one to the other, with or without accommodation.
- Have a sufficient level of hearing to determine changes in frequency and amplitude of sounds.

Communication

- Have a sufficient level of hearing and speech to be able to communicate clearly, efficiently, effectively and sensitively with patients, their families, and the health care team in English.
- Have a sufficient level of writing skills to communicate clearly, efficiently, effectively and concisely with the health care team in English.

Motor

- Have a normal range of motion and strength to perform large motor tasks such as moving patients from chair to bed with a coworker, placing patients in correct position for the examination and pushing or pulling large wheeled equipment up and down ramps and long hallways.
- Have good hand-eye coordination, normal range of digital/hand/arm dexterity, and hand and arm strength and control.
- Be able to sit and stand for extended periods of time ranging up to three hours in duration.
- Have a normal range of flexibility to reach, bend, and stoop.
- Be able to move from room to room and in small spaces around equipment and patients.
- Travel to clinical sites.

Behavioral and Interpersonal Attributes

Students must possess the emotional health required for full utilization of intellectual abilities. This includes but is not limited to the following:

- Exercise good judgment.
- Interact respectfully with all individuals.
- Maintain a clean, neat and healthy appearance at all times.
- Promptly complete all responsibilities.
- Safely perform all tasks.
- Function effectively under average amounts of stress with occasional periods of taxing workloads.
- Adapt to changing environments.
- Display flexibility.
- Function in the face of uncertainties inherent in clinical practice.
- Function compassionately, with integrity and concern for others.
- Interact with the staff as a team member and with integrity.
- Maintain the confidentiality of patients and medical information.
- Perform tasks in a timely manner.

Academic Performance

- Obtain information from lectures, labs, reading assignments, audiovisual materials and written materials including texts, graphs, images and video.
- Use a computer keyboard.
- Perform analyses, measurements, calculations, reasoning and problem-solving tasks.
- Take multiple-choice, short-answer and essay tests.
- Deliver presentations.

- Take proficiency lab examinations.
- Perform vascular exams on patients in a clinical setting.
- Perform tasks in a timely manner.

Vascular Ultrasound and Technology: Academic Policies

Good Academic Standing

High academic performance is expected in required courses. Students will be considered in good standing unless placed on academic probation. An annual cumulative GPA of at least 2.0 is required to be eligible to continue in the program. A grade of "C" or higher in the required courses is necessary to be eligible to continue in the program; a grade of "D" or "F" may result in dismissal from the program. The faculty reserves the right to request the withdrawal of a student whose conduct, health or performance demonstrates lack of fitness for continuance in a health profession. Any such student not voluntarily withdrawing will be dismissed from the University.

Academic Probation

Academic probation is assigned to any student who receives a quarterly grade point average below 2.0, or whose cumulative GPA falls below 2.0. Students placed on probation have one quarter in which to regain good standing. Failure to do so may result in dismissal from the University.

Clinical Work

A student may not be paid as an employee during clinical credit hours. Also, a student may not count any paid work as an employee for clinical credit hours in the program.

Blood Borne Pathogen and Communicable Disease Policy

If a student is exposed to a blood-borne pathogen or communicable disease, he or she should report to the emergency room for care.

Student Academic Appeals and Grievance Procedure

A student wishing to appeal an academic decision should follow the College of Health Sciences appeal process in the College of Health Sciences policies section of the University catalog.

College of Health Sciences/Rush University Academic Policies

Please see the College of Health Sciences academic policies section of the University catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Vascular Ultrasound and Technology: Curriculum

Year 1		Credit Hours
Fall Quarter		
VAS-301	Vascular Anatomy, Physiology and Pathophysiology	3
VAS-304	Vascular Medical Terminology	1
VAS-311	Ultrasound Physics and Physical Principles I	3
VAS-311L	Ultrasound Physics and Physical Principles I Lab	1
VAS-321	Patient Care Practices	2
VAS-321L	Patient Care Practices Lab	1
VAS-331	Venous Ultrasound Procedures	2
VAS-331L	Venous Ultrasound Procedures Lab	1
Winter Quarter		
VAS-310a	General Pathophysiology I	2
VAS-313	Ultrasound Physics and Physical Principles II	3
VAS-341	Arterial Physiologic Procedures	3
VAS-341L	Arterial Physiologic Procedures Lab	1
VAS-351	Cerebrovascular Ultrasound Procedures	2
VAS-351L	Cerebrovascular Ultrasound Procedures Lab	1
VAS-405	Laboratory Management	2
VAS-354	Transcranial Doppler (TCD)	1
Spring Quarter		
VAS-310b	General Pathophysiology II	3
VAS-361	Abdominal Vascular Ultrasound Procedures	2
VAS-361L	Abdominal Vascular Ultrasound Procedures Lab	1
VAS-371	Advanced Vascular Testing and Topics	3
VAS-371L	Advanced Vascular Testing Lab	1
VAS-381	Introduction to Research	2
VAS-381L	Introduction to Research Lab	1
VAS-401	Professional Practice in Ultrasound	3
Summer Quarter		
VAS-415A	Clinical Skills in Vascular Ultrasound I	10
VAS-420A	Professional Skills I	1
VAS-431	Senior Lectures/Case Presentations I	1

Year 2		Credit Hours
Fall Quarter		
VAS-415B	Clinical Skills in Vascular Ultrasound II	6
VAS-420B	Professional Skills II	1
VAS-425A	Cumulative Clinical Skills in Vascular Ultrasound I	4
VAS-432	Senior Lectures/Case Presentations II	1
CHS-510	Health Care in America	2
Winter Quarter		
VAS-415C	Clinical Skills in Vascular Ultrasound III	6
VAS-420C	Professional Skills III	1
VAS-425B	Cumulative Clinical Skills in Vascular Ultrasound II	4
VAS-480	Vascular Ultrasound Comprehensive Review	2
Spring Quarter		
VAS-415D	Clinical Skills in Vascular Ultrasound IV	6
VAS-420D	Professional Skills IV	1
VAS-425C	Cumulative Clinical Skills in Vascular Ultrasound III	4
VAS-433	Senior Lectures/Case Presentations III	1
Hours Required for BS Degree:		96

Advanced Placement

Admitted students who have passed the American Registry for Diagnostic Medical Sonography (ARDMS) Sonography Principles and Instrumentation (SPI) exam or earned the RVT (Registered Vascular Technologist) credential may request advanced placement status in the program. With proof of passing these credentialing exams, students can qualify to receive credits according to the advanced placement description on the Vascular Ultrasound Program website: www.rushu.rush.edu/vastech.



RUSH UNIVERSITY

The Graduate College



Welcome to The Graduate College



On behalf of the faculty and staff, let me welcome you to the Graduate College. This is a time of explosive growth in biomedical knowledge occurring simultaneously with rapidly expanding healthcare need. We have an unprecedented challenge in optimally preparing graduate professionals to contribute to progress in health outcomes for this dynamic world. At the Graduate College, we have recently re-engineered our laboratory-based doctoral program and now are working on implementing similar changes in our corresponding master's program so our students will be better prepared to address emerging biomedical realities.

Our goal is to provide analytical skills and to hone problem solving approaches to prepare our graduate students to be collaborative and creative in addressing the complex problems inherent to biomedicine. In redesigning our graduate curriculum, we have worked with both faculty and students to synthesize many disciplinary perspectives to address the complex challenges inherent to improving outcomes with major chronic diseases. Our faculty includes a wide range of highly accomplished and nationally impactful researchers and educators, who are deeply committed to biomedical professional development. The Graduate College is an institution that is invested in the success of each and every student that walks through our doors. Thank you for your interest in the Graduate College, and we look forward to working together in advancing your professional career goals

James L. Mulshine, MD
Professor, Acting Dean of the Graduate College

The Graduate College: Mission, Vision and Philosophy

Mission

The mission of the Graduate College of Rush University is to promote and assure excellence in research education and mentoring programs responsible for training outstanding and diverse candidates in the basic and clinical sciences. At Rush, the translation of bench research to the clinic is the primary focus of the institution. The faculty works side by side with the students to devise better detection approaches or to develop more effective interventions that improve patient outcomes. The college promotes cooperative efforts and provides high-quality educational and research programs to better prepare students for successful careers and to embrace lifelong professional development.

Vision

Basic and clinical scientist graduates of the Graduate College will become leaders in their respective research fields, secure leadership positions in academia and/or industry compete successfully for extramural grants and train the next generation of research scientists.

Philosophy

Our mission statement is as follows: *Rush University provides outstanding health sciences education and conducts impactful research in a culture of inclusion, focused on the promotion and preservation of the health and well being of our diverse communities.* This statement outlines a vibrant role for the Graduate College in preparing leaders to help Rush and other institutions that share similar aspirations to achieve success in transforming our health care system.

The Graduate College was originally established in 1981, to provide opportunities for students to work with nationally recognized faculty to earn doctoral degrees in the sciences basic to health care. Students are engaged in highly individualized programs to maximize opportunities for self-realization and the faculties' opportunities for sharing their scholarly development, expertise and experiences on a personal basis. While still committed to this goal, the Graduate College is also responding to concerns communicated by the National Institutes of Health regarding optimal biomedical workforce preparation. To address issues with the pace of innovation and the realities of the rapidly evolving workplace, we have recently completed a comprehensive re engineering of our laboratory-based doctoral curriculum. In this process, we have placed a deeper emphasis on presenting course material from an integrated conceptual framework so that students are better prepared to manage the

rapidly expanding body of complex biomedical information. Our curriculum moves from a disciplinary perspective to a more systematic, interdisciplinary orientation. Thus, all laboratory-based graduate students will now jointly participate in a common, integrated first year curriculum exploring the shared foundations of biomedical sciences. This approach leverages the significant interaction of students with interests across the spectrum of biomedical sciences and provides a common knowledge base to allow students to move more fluidly into the team-based research phase of their specific doctoral programs. This Integrated Biomedical Sciences curriculum also creates a more inclusive and welcoming feeling among students to encourage group learning and problem solving.

The new Integrated Biomedical Sciences master's program starts with a shared first year course plan, but in the second year, the five-year doctoral program provides flexibility for students to personalize their research activities in any of five areas of shared disease or system focus.

The Graduate College also includes other specialized master's programs for laboratory-based research or clinical science research as well as in biotechnology. These course offerings address the expanding need for clinical scientists and highly trained technical staff, respectively, to advance science in the 21st century. This program preserves the Rush organizational pattern, including a high degree of individualized faculty and student interaction in the educational processes of the college consistent with the teacher-practitioner model. Students find the open, collaborative environment across the college with a shared focus on translational research to constitute a highly distinct educational environment.

The Graduate College: Organization

To facilitate its educational mission, the laboratory-based research PhD program, called the Integrated Biomedical Research program, is organized into five tracks that represent interdisciplinary areas of research excellence at Rush that are also highly aligned with areas of clinical strength. This alignment forms a fertile nexus for sustained, innovative translational collaboration. These interactions typically involve fluid interactions of relevant scientists, clinicians and other professionals working in flexible team structures. This new organizational approach builds on the strong legacy of the Graduate College but is redesigned to create a more stimulating learning environment for the students. This entails moving from the traditional discipline-focused curriculum to a more integrated, systems biology approach embracing multidisciplinary team-based science

required for greater success in addressing existing complex biomedical challenges. The learning environment in the new program format will enhance student-to-student interaction as they are immersed into the Rush research environment. All students participate in an integrated shared curriculum and then choose to conduct their doctoral/ thesis research in one of five interdisciplinary tracks related to areas of excellence in clinical care at Rush. At the same time, we have broadened the array of faculty representing a wider range of disciplines from basic to clinical to community working together to address critical biomedical problems in the five track areas.

The five educational/research tracks of the college are as follows:

- Cardiovascular and Respiratory Biology
- Function and Disorders of the Musculoskeletal System
- Function and Disorders of the Nervous System
- Infection, Immunity and Inflammation Research
- Translational Cancer Research

The primary goal of each track is to provide excellent graduate education in the sciences, from basic to medicine. The tracks of the college are flexible and responsive to the changing needs and experiences in their disciplines. This approach is highly aligned with our shared vision: The Rush learning community will be the leading health sciences university committed to transforming health care through innovative research and education.

The educational process for the first year integrated curriculum is coordinated by an associate program director who works to ensure that the integrated first year curriculum is delivered in a fashion that supports student mastery in approaching complex biomedical problem solving. The overall program director is responsible for the learning environment for the remainder of the dissertation years and is charged with achieving full programmatic integration including learning assessment as well as timely student progression. Each track leader interacts with the other track leaders and the Integrated Biomedical Sciences directors through the Educational Committee to ensure smooth functioning of this program.

The Graduate College Council is the senior representative body of the college. Its membership includes all track directors and program directors including the directors of the biotechnology and clinical research programs, as well as an elected faculty member from each of the tracks and three students from different divisions (elected by the students annually). Only the elected members and students are allowed to vote. The Dean

or his or her designee serves as the chair of the council. The council is responsible for setting policies for the admission of students; the formulation and adoption of general operating policies, standards and procedures of the college; the appointment of the Graduate College faculty; and the approval of those recommended for degrees. Although the Dean and the Council maintain significant oversight of programs in the Graduate College, the tracks also establish policies and procedures for the Integrated Biomedical Sciences program, consistent with the policies and procedures of the college and the University. The Graduate College Council periodically reviews all divisional policies and procedures.

The faculty of the Graduate College is drawn from the faculty of the other colleges of Rush University, who hold the same rank in the Graduate College as in their primary colleges. No faculty member has a primary appointment in the Graduate College.

Additional Graduate College Programs

Beyond the Integrated Biomedical Sciences programs, the Graduate College oversees two additional programs. These programs are Master of Science in

- Clinical Research
- Biotechnology

These programs are administered out of the Dean's office, and both are overseen by the Graduate College Council. Faculty members from several divisions participate in the education of students in these programs.

The Graduate College: Admission Requirements

The faculty of the Graduate College encourages diversity among the student population and therefore seeks to admit persons from various backgrounds. The Graduate College uses the following guidelines to evaluate candidates for admission. Individual divisions within the college may have additional requirements and criteria for admission. Applicants are encouraged to first check with the division of interest. The college's requirements are as follows:

Deadline for applications: Priority deadline is May 1 for all research two-year MS and basic sciences PhD students; however, all F-1 visa holders are encouraged to apply by March 15. For all other programs, application must be completed by July 1 and all supporting documents must be received by August 1. (Some programs may have earlier deadlines. Please check with the individual program director early in the application process.)

Applications to the Graduate College are reviewed considering all parts of the application when determining admission. The following documents must be completed and submitted in order to be considered for admission (minimum requirements listed under each point below):

1. Online application submitted by the deadline.
2. Statement of purpose which includes, in a maximum of 500 words, a statement about the applicant's research interests as they pertain to graduate school in the biomedical sciences. Applicants should include past undergraduate studies, research experience and activities that have influenced their specific areas of interest. Previous research experience is strongly preferred for admission into the PhD program.
3. Curriculum vitae or resume
4. Three letters of recommendation (a minimum of two should come from academic sources). Letter must be on an official letterhead and submitted by the recommender.
5. GRE scores, or scores of an equivalent test (e.g., MCAT, DAT, PCAT, or USMLE scores).
6. Applicants must perform at least at the 50th percentile on these standardized examinations.
7. GRE will be waived for applicants with a PhD degree in the basic sciences and may be waived for applicants with a professional degree in the health sciences (e.g., MD, DO, DDS, PharmD).
8. Applicants with an international medical degree must submit USMLE Step 1 and Step 2 scores with a minimum performance at the 50th percentile.
9. Official transcripts from all institutions attended.
 - Applicants must hold a bachelor's degree from an accredited U.S. institution with a minimum GPA of 3.0 on a 4.0 scale. Students with an international degree must submit official transcripts along with a course by course evaluation from ECE, which confirms the equivalence of at least a U.S. bachelor's degree with a minimum GPA of 3.0 on a 4.0 scale.
 - Completion of the following courses with a "B" or better grade is preferred: 2 semesters of Biology with laboratory, 2 semesters of Chemistry with laboratory, Biochemistry or Cell Biology with laboratory, Calculus, College Physics.
10. TOEFL scores must be submitted for all non-native English speakers.
 - The minimum TOEFL score required for admission is an 80.
 - TOEFL scores will be waived for non-native English speakers who have completed a bachelor's degree or higher from a U.S. accredited institution.

Completion of an interview with Graduate College faculty is required. All competitive PhD applicants will be asked to interview over the phone, in person, or via Skype.

Acceptance of transfer credit: Petition for transfer of graduate credit is consistent with University policy. Graduate level transfer credit is subject to the approval of the faculty advisor, program director or designated college administrator based on an evaluation of quality and equivalence. For graduate level programs, no more than one-third of the total number of required credits that contributed to one's GPA may be granted to a student as transfer credit for work done at another graduate institution.

The Graduate College: Core Curriculum

The Graduate College curriculum is designed to enhance interaction among students from all the programs while at the same time provide the basic knowledge base the faculty have deemed necessary to become successful in science. The Graduate College curriculum runs for two consecutive semesters (fall and spring) and provides introductory training in molecular genetics, genomics and protein biology, cell biology, tissue biology and cell signaling, as well as provides a comprehensive and systematic overview of physiology and pharmacology. Students will also learn basic theories underlying modern scientific technique. In addition, the student will take courses in ethics, scientific writing and basic statistics. These courses will be supplemented by advanced courses offered by the individual divisions.

The following courses constitute the Graduate College Core (GCC) curriculum:

- GCC-501 Molecular Biology: Genome to Proteome
- GCC-502 Cellular Biochemistry: Proteins, Transport and Signaling
- GCC-503 Functional Cell Biology
- GCC-504 Functional Tissue Biology
- GCC-505 Techniques in Biomedical Sciences
- GCC-506 Research Ethics
- GCC-507 Biomedical Statistics
- GCC-508 Scientific Writing
- GCC-511 Readings in Molecular Biology
- GCC-512 Readings in Cellular Biochemistry
- GCC-513 Readings in Functional Cell Biology

- GCC-514 Readings in Functional Tissue Biology
- GCC-520 Introduction to Physiology and Pharmacology I
- GCC-521 Introduction to Physiology and Pharmacology II
- GCC-546 Principles of Biostatistics I
- GCC-547 Principles of Biostatistics II
- GCC-551 Ethics in Biomedical Research and the IRB
- GCC-593 Introduction to Grantsmanship
- GCC-620 Introduction to Teaching

In addition to these requirements, full-time doctor of philosophy (PhD) candidates in the Graduate College must attend a minimum of four ethics seminars per year provided by the Office of Research Integrity following their first year of classes. Failure to attend the required number of lectures or equivalent will delay graduation.

The Graduate College: MS and PhD Degrees

The Graduate College prepares students for the Master of Science and Doctor of Philosophy degrees. The Doctor of Philosophy is awarded in recognition of high achievement in a particular field of scientific research as evidenced by submission of a dissertation that demonstrates the power of independent investigation and contributes to the body of existing knowledge. An undergraduate record of scholastic excellence is an important background for the Graduate College experience. The Graduate College also provides excellent research and training opportunities for advanced medical students who want to take time out of their medical school studies to enroll in the Graduate College in an MS or PhD program. The process of application review includes a search for evidence of creativity and scholarly potential in the applicant. Non-degree students are not admitted with advanced degree objectives and are ineligible to become candidates for advanced degrees. Upon approval by a course director and appropriate registration, any individual may audit a course. In all cases, a student considering application for admission should first establish contact with the director of his or her choice of program to determine divisional/program requirements. The student must meet all of the requirements for progress and graduation in the graduate studies program. In this regard, individualized studies will be programmed to meet the student's need in achieving essential knowledge in preparation for these requirements.

Doctor of Philosophy

The degree of Doctor of Philosophy (PhD) is the highest degree conferred by Rush University. The PhD is restricted to those scholars who have demonstrated superior ability in a recognized academic discipline. While each division has identified requirements, the PhD degree is not awarded following the completion of any specific number of formal courses nor on the basis of miscellaneous course studies and research. The entire PhD program must be integrated and highly research oriented. It should culminate in a work of literary and scholarly merit, which is indicative of the candidate's ability to conduct original research in a recognized specialty (generally in the form of a first-author manuscript). PhD programs are directed by selected faculty who work closely with graduate students. In practice, each program is composed of formal courses, guided individual study in a chosen field or discipline, study in such cognate subjects as may be required by the candidate's advisory committee and original research that serves as the basis of a required scholarly dissertation.

Admission to Candidacy

Admission to candidacy is evidence that the doctoral student has successfully completed all preliminary coursework and is prepared to move into his or her intensive research experience. Depending upon the divisional requirements, these exams will test accumulated knowledge, scientific reasoning and the ability to develop hypotheses and test them with appropriate designs. Admission to candidacy is a demonstration of confidence that the student will successfully accomplish the remaining requirements of the program. Students failing to achieve admission to candidacy, but who have otherwise completed all other prerequisites, will be granted a terminal master's degree.

Dissertation

A doctoral student must complete a dissertation. This document is developed through faculty-guided independent research projects. Review of the dissertation will follow the sequence of steps described in the manual "Preparation of Theses and Doctoral Dissertations." Copies of this manual are available in each graduate division and in the Library of Rush University Medical Center. The dissertation must be original and cannot have been used to meet the requirement of any other degree, either at Rush University or at any other university.

Each student will have a dissertation committee whose role it is to assure that the student's dissertation is of high quality and meets the standards of the division, the college and the University for originality, contribution to the field and scholarly presentation. The committee is also to assure that the student is

making satisfactory progress toward completion of the degree. The dissertation committee is chosen by the student in conjunction with the student's primary advisor and should consist of at least five total members. The primary advisor must be a member of the Graduate College. At least one member of the committee should be from outside of the division, and preferably from outside of the institution. Once the committee convenes, it will choose a chairperson, who cannot be the student's primary advisor. The chairperson will oversee the scheduling and activities of the committee.

At or near the completion of the dissertation, each student will share, by means of a public presentation with the academic community at large, the knowledge that the student has developed. Students are responsible for posting announcements (at least two weeks prior to the presentation) on institutional bulletin boards and emailing all faculty and students of the Graduate College the title of the dissertation, the student's name, and the location, date and time of the public presentation. This public presentation must precede the final approval of the dissertation by the dissertation committee.

Upon completion of the public presentation, the student will meet with the dissertation committee to review the presentation, the dissertation document and the student's preparedness to enter the scientific community. A majority of members of the committee must sign the dissertation certifying the completion of all requirements for the Doctor of Philosophy degree.

Master of Science

The Master of Science degree is offered in many divisions and programs. This degree is designed to offer students an intermediate step in a career path, provide research experience to supplement their primary professional path or provide supplementary training for other reasons. The college offers two types of MS degrees: 1) the research MS is a thesis-requiring program that traditionally takes two years to complete; and 2) a non-research MS that is a consequence of either a scholarly endeavor (e.g., writing a review paper) or the successful completion of a series of classes and laboratory skills (i.e., the MS in Biotechnology).

Thesis

The research MS degree requires publication of a scientific thesis that reflects the research experience of the student. This thesis may or may not reflect original work, although original work that is published in peer-reviewed journals is always a goal. The student together with the advisor will form a thesis committee composed of three members: the advisor (who must be a

member of the Graduate College) and two readers. The advisor will work with the student to develop a research project that can be completed within the framework of the program. The readers will assure the quality of the document. Upon completion of the thesis, the student will present the findings in a public forum open to the University. The members of the committee that includes the student's advisor must sign off on the thesis, certifying the completion of all requirements for the MS degree.

The Graduate College: Academic Policies

The Graduate College adopts college-wide policies and procedures and reviews division-specific regulations. Students follow the college and divisional policies in effect at the time of initial matriculation in the Graduate College. However, the Graduate College reserves the right to make substantive changes in its programs after the student's matriculation. Students will be informed in writing by the division director of any changes made during their tenure in the program. Students re-entering the college after an absence will be guided by policies and procedures in effect at the time of re-entry.

Examination Policy

The examination policy is the responsibility of the individual course director, who will inform students of examination requirements for that particular course. A period at the end of the semester is provided for examinations. This period may be used as the course director chooses.

Pass/No Pass Grades

Each division identifies all courses required of its students. Required courses are usually taken for letter grade and not under the pass/no pass (P/N) option. Research hours are generally graded using the P/N option. However, a division may opt to provide a letter grade for research classes (under 600) for master's students. The grading policy for post-candidacy research hours (over 600) for doctoral students is P/N.

Good Academic Standing

To remain in good academic standing, students must maintain a cumulative grade point average of 3.0 and meet the requirements of their division. A student must be in good academic standing to be admitted to candidacy and to graduate. Students failing to maintain a GPA of 3.0 will be notified by the Dean in writing that their student status has been changed to "on probation." Students who fail to remediate their deficiencies within one academic year or are placed on probationary status a third time are subject to dismissal by the Graduate College.

Academic Difficulty

Each division has policies and procedures regarding students who fail to maintain good academic standing. While the responsibilities of informing students of their academic problems and of establishing conditions for regaining good academic standing reside within the divisions, the Graduate College Council monitors the progress and promotion of all students and gives final approval to award students' degrees.

Dismissal

Each division establishes grounds for dismissal beyond the minimal criteria established by the Graduate College. Should a division recommend the dismissal of a student, the director will forward such recommendation to the Graduate College Council for final action. Letters of dismissal come from the Dean. Appeal of a dismissal action begins within the appropriate division.

Full-time Enrollment

Full-time enrollment is required of all Graduate College students with the exception of Clinical Research students and students within the divisions of Nursing and Health Sciences. Full-time students must register for at least 12 semester hours for the fall and spring semesters and for 9 credit hours for the summer term of the first year; 10 semester hours thereafter per term are required for full-time enrollment. Students must obtain written permission from the division director for exceptions to this policy. Students receiving a master's degree from the Graduate College as a full-time student must be enrolled for a minimum of two semesters and the summer term; part-time students earning a master's degree must be enrolled a minimum of two semesters per academic year. The minimum requirement for graduation from the college is 53 hours. At the time of graduation, the student must be enrolled in the college. The maximum time allowed for enrollment for a full-time master's degree is four years starting with the first semester of official enrollment, and the maximum time allowed for the PhD degree is five years.

Residency

Doctor of Philosophy (PhD) candidates are expected to meet all requirements for graduation within five enrolled academic years in the Graduate College (excluding leaves of absence; see below). This period begins with the semester in which the student formally matriculates. A student exceeding that time limitation must submit to the Graduate Council, in writing, a request to extend his or her candidacy beyond that time period. This request must identify the reasons for the extension and provide a written plan with reasonable deadlines for completion. This document will be co-signed by the student's advisor and

division director. The council will then vote whether to accept the extension or not (passed by simple majority). The student's advisor will then provide an update on the student's progress after six months. One year after the extension is granted, the student is expected to complete all requirements. A second request may be made by the student's advisor and division director, but only will be accepted through a two-thirds majority of the voting members present at a formal hearing of the Graduate College Council. Within one year of that second request, the student must complete all requirements for the PhD degree or face dismissal. Alternatively, the student may be awarded a MS degree upon the recommendation of the student's graduate division.

Readmission

Any student who has withdrawn from the University or any dismissed student may apply for readmission by submitting an application for this purpose to the Graduate College admission office. An interview may be required. A re-entering student must meet the conditions for re-enrollment stated in his or her dismissal or re-entry acceptance letter and all policies, requirements and course sequences in effect at the time of re-entry. The student will pay tuition and fees at the rates in effect at the time of re-enrollment. Application deadlines may vary by division.

Academic Progression

The graduate division, in concert with the rules of the college and Rush University, develops specific regulations governing the process that results in final awarding of the degree. While such regulations differ slightly from one division to another, the Graduate College Council reviews each track's program and regulations for approval. In all cases, graduate divisions are required to be explicit and clear about regulations that will affect the candidate. This must be stringently observed in divisional regulations concerning selection of principal advisors, advisory committees, and plans of study. Similarly, divisions will be explicit and clear concerning academic policies and procedures surrounding qualifying, preliminary and final examinations when they are required. The divisions are also responsible for providing the candidate with the support needed to plan and conduct the dissertation research. At the same time, a major responsibility of the student is to become familiar with the regulations and expectations of his or her chosen division. These regulations and expectations are included in this catalog within the sections devoted to each divisional program and are also included within program publications. The student is responsible for understanding the regulations and monitoring changes that may occur during his or her tenure in the program.

Student Academic Appeals Policy

Any student of the Graduate College may appeal a final course grade, failure on a preliminary or comprehensive examination, or failure of the thesis/dissertation that results in his or her academic probation or dismissal from the University. A student may also appeal an unreasonable delay in his or her graduation from the University. No other issues may be appealed through this process.

The process for filing an appeal is maintained by each division. The student may request a copy of the division appeal process from the division director. This process will be completed within one semester. If a resolution cannot be achieved at the division level, the following procedure must be followed. At any step in the process, the student may withdraw the appeal by written notification to the program director with a copy to the Dean. In the event of a dismissal decision, a student may continue to enroll until the appeal process is completed or the student withdraws the appeal.

Step 1: If the student wishes to appeal the decision beyond the division, within two weeks of receiving a decision from the division, the student will submit a written statement to the Dean requesting consideration of his or her case by an advisory panel. The student must provide the following in the written statement.

- Course number and grade being appealed or other cause for probation or dismissal, i.e., failure of preliminary/comprehensive examination or thesis/dissertation
- Action being requested
- Justification for the request
- An outline of the efforts and actions already taken to obtain consideration of the request

The student will send copies of this communication to the division director and the department chairperson. In addition, if a course grade is being appealed, the student will send a copy to the course director. If the evaluation of a thesis or dissertation is being appealed, the student will send a copy to the chairperson of the thesis/dissertation committee. The advisory panel will be the Graduate College Council. Its chairperson will be appointed by the Dean from among the members. The division director of the student's division and any other member who is evaluating the student's academic status will not vote.

Step 2: Within two weeks after notification to the Dean, the chairperson of the advisory panel will arrange a meeting of the advisory panel. It will submit a written recommendation to the Dean.

Step 3: Within two weeks following receipt of the advisory

panel's recommendation and upon discussion with the student and with others as appropriate, the Dean shall reach a final decision and notify each party of the decision. The decision reached by the Dean is final.

The issues discussed and the outcomes of all meetings in this appeal process are documented. This record-keeping is the responsibility of a faculty member who is to be designated at each meeting. Copies of the documentation should be distributed to the individuals present at a meeting, to the division director, and to the Dean and placed into the student's academic file.

Rush University Academic Policies

The Academic Resources and Policies section of this catalog contains additional Rush University academic policies.

The Graduate College: Committees

The Graduate College Council

The Graduate College Council is the senior representative body of the college. Its membership includes all division directors, the directors of the Master's in Biotechnology and Clinical Research programs, an elected faculty member from each division and three students from different divisions elected by the students annually. Only the elected members and students are allowed to vote. The Dean or his or her designee serves as the chair of the council. The council is responsible for setting policies for the admission of students; the formulation and adoption of general operating policies, standards and procedures of the college; the appointment of Graduate College faculty; and the approval of those recommended for degrees.



The Graduate College: Academic Programs

Anatomy and Cell Biology (MS and PhD*)

Biochemistry (MS and PhD*)

Biomechanics (MS and PhD*)

Biotechnology (MS)

Clinical Research (MS)

Health Sciences (PhD)

Immunology/Microbiology (MS and PhD*)

Integrated Biomedical Sciences (PhD)

Medical Physics (PhD*)

Radiological Science (MS)

Molecular Biophysics and Physiology (PhD*)

Neuroscience (PhD*)

Nursing Science (PhD)

Pharmacology (MS and PhD*)

**PhD: PhD program is closed for entry beginning Fall 2015.*

Integrated Biomedical Sciences: Philosophy

The PhD in integrated Biomedical Sciences is designed to educate science professionals for leadership in research and academic positions, as well as provide career path education relevant to their specialized field. Graduates of this program will perform high-quality, impactful biomedical research at colleges and universities, government agencies, hospitals and nonprofit agencies and in industry. Students in the program will work with faculty and scientists to generate new knowledge in the fields of biomedicine using sophisticated research methods and statistics. As a part of the program, students are required to pass a comprehensive preliminary examination and demonstrate their knowledge of core and concentration-specific coursework. They will design and conduct research that culminates in a dissertation, and they will disseminate their scientific findings through scholarly publications and presentations.

Integrated Biomedical Sciences: Admission Requirements

Applicants must enter the program in the fall semester in order to begin the required coursework in the core curriculum. The deadline for submission of applications is generally March 1. International applications can be accepted after March 1 but must take into consideration the delays associated with the necessary visa arrangements. The Integrated Biomedical Sciences Program has the following requirements for admission to the program:

- A baccalaureate degree from an accredited college
- Coursework in biology, cellular biology, molecular biology, physics, chemistry, organic chemistry, physical chemistry and mathematics, including calculus, is highly recommended. Upper-level biochemistry or physiology courses are also highly recommended.
- Academic transcripts from all baccalaureate and post-baccalaureate educational experiences are required. These should provide a minimal grade point average of 3.0 overall (A = 4.0). Higher grades are expected in science courses and evidence of research experience is preferred.
- GRE or MCAT scores are required. All applicants whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL). Applicants from foreign countries must have their transcripts evaluated by an independent agency (i.e., ECE and WES).
- A statement of the applicant's interests and goals needs to be included as an essay in the application. If possible, identify a particular area of interest.

- Three letters of recommendation, preferably from science faculty who can evaluate the character of the applicant, the applicant's academic and research performance, and the applicant's ability to think and work independently.

The Admissions Committee will evaluate applications. All prior academic experience and the letters of recommendation will be evaluated for an indication of the applicant's potential for success as a graduate student and future independent investigator. With rare exceptions, PhD applicants will be required to interview with faculty members before admission to the program.

Acceptance into the doctoral program is limited by the availability of faculty and also by the availability of stipends. All accepted doctoral students receive a competitive stipend and tuition scholarship. The stipend and tuition scholarship is renewed each year providing the student is making satisfactory progress towards the degree.

Integrated Biomedical Sciences: Curriculum

Year 1	HR
Fall Semester	
BTN-523 Tools for Research	1
GCC-501 Molecular Biology	2
GCC-502 Cellular Biochemistry	2
GCC-505 Techniques in Biomedical Sciences	1
GCC-511 Readings in Molecular Biology	2
GCC-512 Readings in Cellular Biochemistry	2
BTN-525 Experimental Design & Models of Disease	2
Spring Semester	
GCC-503 Functional Cell Biology	1
GCC-504 Functional Tissue Biology	2
GCC-506 Research Ethics	1
GCC-507 Biomedical Statistics	2
GCC-513 Readings in Functional Cell Biology	2
GCC-514 Readings in Functional Tissue Biology	2
GCC-531 Topics in Biomedical Integration	1
GCC-508 Writing Practicum	2
GCC-530 Lab Rotations	2
Summer Term	
GCC-532 Topics in Biomedical Integration	4
GCC-530 Lab Rotations	5

continued

Year 2	
Fall Semester	
GCC-593 Introduction to Grantsmanship	1
GCC-694-698 Advanced Topic Seminar (track specific)	1
GCC-699 Dissertation Research	1
GCC-XXX* Track Specific Cognates	3
GCC-XXX* Electives	2
Spring Semester	
GCC-694-698 Advanced Topic Seminar (track specific)	1
GCC-699 Dissertation Research	1
GCC-547 Biostatistics II	1
GCC-XXX* Track Specific Cognates	3
Summer Term	
GCC699 Dissertation Research	2

GCC = Graduate Core Curriculum

*GCC XXX Actual courses numbers will vary with elective or cognate required by the track.

BTN = Biotechnology course

In years 3-5 the emphasis is on research. Students work with their track director, their dissertation advisor and their committee to determine the most appropriate mix of electives and research hours. A typical registration is listed below:

- GCC XXX Electives: 9 credit hours total to be dispersed among the 2nd through 4th years
- GCC XXX Cognates (track specific requirements): 8 hours in the 2nd through 4th years
- GCC 694-698 Advanced Topics: 1 semester hour each fall and spring term of the 2nd through 4th years. The topic course should align with the student's track or research interests.
- GCC 699 Dissertation Research (1 semester hour each fall and spring term, 2 semester hours in the summer terms): Although there is a low number of credit hours, it is considered to be a full time commitment to research.

While registrations appear similar in years 3-5, the nature and character of the research changes and the student passes through a number of steps towards completion of the PhD.

Integrated Biomedical Sciences: PhD Dissertation Program Progression

Year 1

Classes and Comprehensive Exam:

The goal of the coursework in the first year is to expose the students to the biomedical sciences to enable them to design and approach a research problem from molecular, biochemical, cellular and organ system perspectives. The reading courses provide a critical understanding of the literature and existing base of knowledge. They will also show the student how new knowledge in these areas can help us understand diseases and use this information to identify new therapeutics. This broad-based approach to disease is the core of the Integrated Biomedical Sciences program. In the spring semester, the Topics in Biomedical Integration course (GCC 531) is offered. In this course, a specific disease will be studied from the molecular perspective to organ system failure under faculty direction. The students will then have a group project in which they use the approaches they have learned to study another disease. This project will strengthen student skills in preparation for the comprehensive exam. In the summer, GCC 532, Topics in Biomedical Integration II, is the comprehensive exam, in which students will be given an individualized disease topic related to their planned research. They will be required to write a literature review approaching the topic from each biomedical perspective.

Year 1

Research Experience:

During the first year the student will have three lab rotations. Each rotation must be in a different laboratory. For uncommitted students (funded by the Graduate College or the NIH), the laboratory rotations will expose the student to a range of research environments. Students are expected to learn techniques and attend all lab meetings, etc. Based on these rotations, the student will submit the names of three potential advisors with a priority ranking to the Integrated Biomedical Sciences education committee. The Integrated Biomedical Sciences education committee, in consultation with the potential advisors, will decide which student will be matched with which advisor. Students committed to a particular laboratory (funded by the research advisor's grants) are still required to take three laboratory rotations. During the first year, the student will select a track and will identify potential research advisors. The program director, the track director and the potential research advisors will then select the student's comprehensive exam topic. Advisors will be identified by the end of the summer term, following the comprehensive exam and completion of rotations.

Year 2

Track Selection, Research Experience, Qualifying Exam

The selection of a research advisor will significantly influence the student's selection of a research track. Subsequent classes will be dictated by the track cognates and electives and by relevant electives offered in other tracks. The selection of electives should complement research activity and the interests of the student and should help prepare him or her for the career choice identified through the use of the Individual Development Plan (IDP) website and additional resources provided by the Graduate College. When the student is not in class or studying, the student should be working on his or her research project. The goals of the 2nd year are to learn the relevant laboratory techniques and to develop a research proposal in conjunction with the research advisor. The research project will advance knowledge in a specific discipline and yield first-author scientific publications for the student. The student's research proposal should include at least three specific aims and be written up as an F31 grant (See "Dissertation Proposal and Presentation" below). The student must select a dissertation committee and present the proposal to the committee by the end of the 2nd year. The proposal presentation to the committee is considered the qualifying exam. Acceptance of the proposal by the dissertation committee means the student is a candidate for the PhD.

The student's assessment at this time relates to the following student outcomes:

- The graduate is able to acquire research skills, collect and analyze data, and interpret results in order to address an original research question.

In addition, this step begins the continuing assessment of the following outcomes:

- A graduating student is capable of independent critical thinking and writing as well as proposing, performing and effectively presenting his or her research.
- The graduate is able to work collaboratively with other scientists, physicians and health care professionals to give and obtain feedback concerning the approach to research problems, data analysis and implications of research.

The student creates an Individual Development Plan (IDP) to better define his or her areas of interest including teaching, administration, research in industry, or academic research. Upon graduation, the graduate will have used the IDP, mentorship and training opportunities to refine his or her career path.

Student progress is evaluated at the end of each year in years

2-5. For year 2, the student's mentor and track director will assess student progress relative to expected outcomes. In years 3-5, the student will submit a written report documenting progress toward expected outcomes. The mentor and track director will also submit their assessment of student progress for the year. Then a meeting with the student, mentor, and track director will take place at the end of each year to discuss the student's progress.

Year 3-5

Research Progress/Publications/Dissertation

The research advisor monitors the day-to-day progress of the student. The dissertation committee will meet at least once per year to monitor progress and to approve any changes to the proposed research project. The committee may meet more frequently, especially after the approval of the student's research proposal. The student is expected to attend national meetings, make presentations, present posters, etc., and become a part of the scientific community. Likewise, the student should be submitting research articles. The program requires that the research project yield at least one first-authored research article accepted for publication in a peer-reviewed journal. The publication requirement is necessary but not sufficient for graduation. The dissertation committee will continue to assess student progress on the aims and determines when the student has completed his or her dissertation. (See "Dissertation Proposal and Presentation" below.)

The student's assessment continues on the outcomes listed above with emphasis on the growth of research and communication skills. Likewise it is expected that the communication outcomes will also become more centered on written communication in the form of abstracts, peer-reviewed journal articles and the dissertation as the student begins to complete the following outcome:

- The graduate is able to contribute to the scientific literature in an area of expertise via published abstracts, a dissertation and by the publication of a first-authored research article in a refereed journal.

Minimal Credit Hours Required for the Integrated Biomedical Sciences PhD Degree

The PhD in Integrated Biomedical Sciences should be completed in five years and requires completion of 145 semester hours of credit distributed as follows: core courses (37), concentration specific cognates (16), electives (9), and dissertation research (83). The core curriculum, which will be common to all students, builds knowledge and skills in research theories and

methodology, data analysis and statistics, laboratory applications and skills, and the molecular and cellular sciences basic to health and disease. These courses will provide systematic exposure to the contemporary process of scientific discovery and will serve as the basis for the remainder of the curriculum. Advanced students entering with a master's (MS) degree in a biomedical science or a doctor of medicine (MD) degree may have classes in the first two years waived based on their prior record. The degree may then be completed in a shorter time providing the student progresses through the process outlined below.

Students will be required, in conjunction with their advisors, to select from concentration-focused cognates in one of five tracks: Translational Cancer Research; Cardiovascular and Respiratory Biology; Immunity, Inflammation, and Infection; Disorders of the Musculoskeletal System; and Disorders of the Nervous System. All students will be required to participate in track-specific Advanced Topic Seminars that span terms 4 through 15. All students will also be required to complete a minimum of 83 semester hours dedicated to completion of their dissertation research. Dissertation hours are consistent across all natural science PhD programs in the Graduate College and encompass laboratory research time required for completion of the dissertation, including analyzing published data; developing a research proposal; learning and applying advanced methodologies and statistical data analyses; developing skills to write and submit a pre-doctoral training grant application; practicing presentation skills to disseminate one's own research findings in national conferences; writing in the form of a research publication; and developing and defending a dissertation project

Integrated Biomedical Sciences: Academic Policies

Academic Advisor/Principal Advisor

The IBS program director functions as the academic advisor to the students during the first year of matriculation in the program. At the end of the first year, the student will identify the track that he or she wishes to enter and will begin working in the laboratory of his or her research advisor. At this time, the track director along with the research advisor will serve as mentors for the student.

Research Advisor Selection

During the first year, the student, in consultation with the program director and track directors in areas related to the student's interests, will select three laboratories for research rotations. Based on these rotations, the student will identify the track he or she is interested in and submit the names of three potential advisors with a priority ranking to the IBS education

committee. The IBS education committee, in consultation with the potential advisors, will decide which students will be matched with which advisors. Students who upon entering the program are committed to a particular laboratory (funded by the research advisor's grants) are still required to take three laboratory rotations. The student's research project should advance knowledge in a specific discipline and yield first-author scientific publications for the student.

Integrated Biomedical Sciences: Track/Research Opportunities

The research tracks for the Integrated Biomedical Sciences PhD program are Translational Cancer Research; Cardiovascular and Respiratory Biology; Immunity, Inflammation, and Infection; Functions and Disorders of the Musculoskeletal System; and Functions and Disorders of the Nervous System. The tracks include qualified faculty from Rush University Medical Center who have an interest in research in these tracks. They come from academic departments as well as clinical departments, which enables the students to select a variety of individuals with basic and clinical expertise to serve on their advisory committees and guide them through their projects.

Qualifying Exams

- **Comprehensive Exam:** In the summer quarter following the first year of classes, all students will take GCC 532, Topics in Biomedical Integration II. This course is their comprehensive exam, in which students will be given an individualized disease topic related to their planned research. They will be required to write a literature review approaching the topic. This comprehensive exam assures that the student can approach a research or clinical problem from a variety of perspectives, accounting for the published literature that illuminates the molecular, cellular and organ system manifestations of the disease process.
- **Qualifying Exam (Dissertation Proposal and Presentation):** The student must select a dissertation committee and present the proposal to the committee by the end of the 2nd year. The student's research proposal should include at least three specific aims and be written up as an F31 grant. Acceptance of the proposal by the dissertation committee means the student is a candidate for the PhD.

Dissertation Research Committee

After passing comprehensive exams, the student selects a research advisor and begins to collect preliminary data. By the end of spring of the 2nd year the student and advisor will select a research committee in consultation with the track

director. This committee will advise the student and evaluate his or her dissertation. The Graduate College requires that the committee include five members and that one member be the student's mentor/advisor. A majority of the committee (at least three members) must be faculty at Rush who are members of the Graduate College. The chair of this committee, who cannot be the student's mentor/advisor, will be chosen at the first committee meeting and will preside at all subsequent meetings and arrange for a timely completion of the dissertation work. The dissertation committee will strive for consensus in all its actions; however, a majority vote of the committee's membership is sufficient for all activities except the final approval of the dissertation, in which case only one member may disagree with the final decision. In addition to the five committee members, either the director of the graduate program, the associate director or a track director will serve as an ex officio member of the committee.

Dissertation Proposal and Presentation

All students will present a thesis proposal before the end of the spring semester of their 2nd year that they have developed with their thesis advisor and graduate committee. The format for the written portion of this requirement is the standard Individual National Research Service Award (F31) mechanism. In addition, a comprehensive review of the literature relevant to the proposed studies is highly recommended as an adjunct document for this requirement. (All students are highly encouraged to submit these proposals to the National Institutes of Health for consideration of funding. The schedule for submission deadlines is April 8, August 8, and December 8 of every year.) Once the written document is completed, the thesis proposal will be presented in a seminar format to the Integrated Biomedical Sciences program with the written portion provided to the student's committee at least one week prior to the presentation date. A formal committee meeting with thesis proposal defense will follow this presentation. During this meeting, the quality and merit of the project will be assessed, and a determination as to whether the work satisfies the degree requirements or what measures for remediation are required to satisfy this requirement will be made at this time. Upon successful completion of this requirement the status of doctoral candidate is conferred on the student. It is recommended that this requirement be satisfied as early in the 2nd year as is reasonably attainable. In the event a student does not satisfy this requirement before the termination of the fall semester of the 3rd year, the student and advisor will need to present to the IBS education committee a reason as to why this requirement has not been satisfied and provide a plan for remediation.

Once the dissertation proposal requirement has been satisfied, all students will present an annual update to their committee in an

identical format as the original proposal meeting with exception to the anticipated year for graduation. Again, after the seminar, a meeting of each doctoral candidate with his or her committee will occur and progress in the last year of the project and in the candidate's career development will be reviewed. A detailed written account for each area should be distributed to the committee prior to this meeting. In addition to this, the website that helps students identify career goals, my Individual Development Plan (myIDP), should be used whenever possible to track and report all professional development activities.

Completion of the Degree

In the candidate's final year, a thesis data defense will be presented to the candidate's thesis committee demonstrating that satisfactory progress has been made on the project to justify development of a plan to complete all experiments and to initiate dissertation preparation. Upon completion of this phase, the student will present the dissertation to the University in written form (approved by the director of the Library of Rush University Medical Center) and present the work in a public one-hour lecture attended by the dissertation committee and faculty and students of the University. The dissertation committee will then meet in closed session with additional questions and will approve the dissertation. Typically the meeting immediately follows the public lecture. In line with the rules and procedures of the Graduate College, the committee strives for a consensus, but the dissertation can be approved over the objections of a single committee member. However, if two committee members disapprove the dissertation, then it is not approved. The awarding of the PhD degree requires the demonstration of a capability for independent research and a contribution to scientific knowledge.

It is assumed that one or more research articles will be included in the dissertation. Since a peer-reviewed, first-authored research article is required for the degree, the dissertation is not considered complete until the publication of this article. If publication is pending, the committee may sign off on the dissertation, but the program director will not sign off until the paper is published.

The registrar's office must be notified of impending completion of the degree by submission of an Intent to Graduate form at the beginning of the final semester. As the dissertation is reaching final form, the student should consult with the University librarian to assure that the dissertation is formatted correctly. Once the dissertation is approved, the student will complete the final checklist to assure that all necessary approvals have been obtained. Students will be required to have an exit interview and provide feedback concerning their experience at Rush University.

Student Grievance Procedure

A student who is having difficulty with a course and anticipates being absent from class or faces an emergency that will impact his or her attendance or performance should contact his or her course director. A student with a problem in laboratory rotations or research should attempt to resolve the issue through direct communication with the laboratory advisor or mentor. A good faith attempt to plan/resolve any issues directly with the course director, laboratory advisor or mentor should always be the first course of action. If this fails, the student should bring the concern to the program director if the student is a first-year student or to their track director if the student has already identified a track. The program director or track director will work with the student and faculty member(s) to resolve the issue. If it is a serious issue, the program director, track director or faculty member may involve the Education Committee. The student may also appeal directly to the Education Committee by requesting in writing that it meet to discuss the issue. The Education Committee will meet within 10 days to render a judgment to best address the interests of the student within the guidelines of the Integrated Biomedical Sciences PhD program.

Students must maintain a B average in the first year. If they drop below a B average, they should discuss the possibility of remediation with the director of the course they had difficulty with. The course director may issue an incomplete grade for a limited time in accordance with university policy while agreed-upon remediation takes place. However, once a failing grade (No Pass or letter grade less than B) has been given, the Education Committee must approve a remediation plan. Until a grade is remedied or the average is improved in some other way, the student is on probation. A student who remains on probation for two semesters will be dismissed.

Students who have entered a track must receive at least a B grade in any courses deemed required by their tract director. Failure to remediate a grade of less than B in a required course or a no-pass grade in a pass/no-pass course or the receipt of another such grade while on probation will result in dismissal.

The Education Committee will also hear complaints concerning academic dishonesty, nonprofessional behavior and student misconduct. The council may become involved through a direct request from a student or faculty member or by a referral from the Honor Code Committee. If the Honor Code Committee has not been involved, the council may refer the initial request to the Honor Code Committee. The council will hear testimony from any involved faculty and/or students. The council may recommend remediation or disciplinary measures. Recommendations for expulsion or suspension are made to the office of the Dean of the Graduate College. Appeals will be heard by the Graduate

College Council (GCC) or a subcommittee of the GCC that will be organized solely for the purpose of hearing the appeal and making a recommendation to the Dean. The ultimate decision regarding student expulsion or suspension rests in the office of the Dean of the Graduate College.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Integrated Biomedical Sciences: PhD Tuition Scholarship and Stipend

All students who are admitted to the IBS PhD program at Rush University Medical Center will receive a tuition waiver and stipend. The stipend is awarded annually and renewed if the student remains in good standing. To remain in good standing, the Graduate College requires that students maintain at least a "B" average. Failure to do so will result in the student being on probation. If the student does not have a B average following one semester of probation, the student may lose the stipend. Students are expected to attend all classes and spend the appropriate time in the lab. All outside employment is forbidden without prior graduate college approval as it interferes with the time and effort necessary to complete the program. This excludes activities that would be in line with Individual Development Plan goals like tutoring, teaching and proctoring.

Anatomy and Cell Biology

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS students, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Anatomy and Cell Biology: Philosophy

The Division of Anatomy and Cell Biology offers study at both the master's (MS) and doctoral (PhD) levels. The master's degree requires a thesis on a laboratory-based research project. The programs are intended for students interested in research and in acquisition of strong foundations in functional human anatomy

and tissue biology. The principal, although not exclusive, focus of research in the department is on the biology of skeletal disease, repair and regeneration. This work is founded in strong interdisciplinary alliances associated with the Rush Arthritis and Orthopedics Institute. This consortium includes the Department of Biochemistry, with its focus on cartilage and connective tissue research; the Department of Orthopedic Surgery, which sponsors research on surgical and therapeutic interventions and supports Rush's gait and biomechanics laboratory; and the Section of Rheumatology, which hosts ongoing studies on arthritis and inflammatory connective tissue disease.

The scope of this work, with its underlying orientation to skeletal and joint disease, provides an excellent forum for graduate study. A premium is placed on critical thinking and communication skills that can help students translate new ideas into effective research questions and lines of investigation. These skills are central to the production of effective grants and publications and to their future roles as scientists and educators. Exploration of structure-function relationships is an exploding frontier for the contemporary anatomist in the medical research setting. Anatomists, like most scientists, are reinventing themselves and their fields in the study of basic disease processes. Extraordinary capabilities of new imaging technology and partnerships with other scientists put structural biologists into the mainstream of mapping molecular processes into three-dimensional space of cells, tissues and organs. This collaborative environment, in both education and research, is a great source of intellectual and personal enrichment.

Anatomy and Cell Biology: Admission Requirements

Applicants are encouraged to complete their application files by April 1 preceding the intended date of admission because the course cycle begins in the fall semester. Applications, however, will be considered on a rolling basis for applicants to the MS or PhD degree program who are enrolled in Rush Medical College or other individuals eligible for advanced standing, e.g., in post-professional master's work. Rush Medical College students must go on a leave of absence from the Medical College while pursuing an MS or PhD degree in the Graduate College and will reenter Rush Medical College upon graduation from the Graduate College.

The Division of Anatomy and Cell Biology seeks students whose backgrounds demonstrate motivation toward research and teaching as well as a capacity for independent study. Consideration is given to the student's area of interest with respect to the expertise of individual faculty.

Preferences for majors in biological sciences should include laboratory experience as well as coursework experience in anatomy, physiology, cell and molecular biology, and embryology/developmental biology. Students with backgrounds supporting interests in biomechanics or kinesiology should contact the program director.

Acceptable academic and test performances (GPA/GRE/MCAT/TOEFL) are described in the Graduate College guidelines. Specific divisional admission requirements may be waived at the discretion of the Division of Anatomy and Cell Biology's Graduate Advisory Committee, thus giving the student advanced standing in either the master's or doctoral program.

Anatomy and Cell Biology: Academic Policies

The division is bound by academic policies of the University and the Graduate College.

Assessment of Progress

The student's progress will be assessed continuously based upon performance in the courses taken and upon evaluations by the Division of Anatomy and Cell Biology's Graduate Advisory Committee. Good academic standing necessary for graduation requires maintenance of a cumulative grade point average (GPA) of 3.0. Students who fail to earn at least "B" grades in courses within the division, or whose overall GPA falls below 3.0, are placed on probationary status for review of their progress by the Graduate Advisory Committee. Pending this review, any student on probation may be recommended for a remedial action or for dismissal from the program. An outline of these specific academic policies and grievance mechanisms is accessible on the departmental website; a printed version may be obtained from the graduate program director.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Anatomy and Cell Biology: Curriculum Doctoral Degree in Anatomy and Cell Biology

The first- and second-year curricula are devoted to anatomy coursework and complementary electives selected from cell and molecular biology, physiology, biochemistry, pharmacology, immunology, neuroscience, biostatistics and ethics in research. Methods and special topics courses during the first year help the student select and work more closely with his or her research advisor

and identify project lines for dissertation research. Participation in the departmental journal club is expected each semester. This is primarily a research-based degree, but doctoral students are also encouraged to serve as instructional assistants in the core anatomy courses to improve their comfort level in working with students and anticipating future roles in teaching. Admission to degree candidacy for dedication to dissertation research is contingent upon successful completion of: 1) coursework requirements, 2) a written comprehensive examination and 3) a dissertation proposal to be presented to the student's dissertation committee for approval.

Master's Degree in Anatomy and Cell Biology

The master's degree is a research-based degree requiring a thesis based on laboratory or experimental work of limited scope. There is some flexibility in selecting courses to meet the master's degree requirements. The core courses that students select to meet these requirements are minimized in order to

direct students' efforts to their thesis projects beginning in the first year. Completion of the full course complement and thesis research would ordinarily take two years.

Core courses are based on corresponding courses in Rush Medical College, but may include a supplement for graduate students. In these sessions students are variously presented with problems and are encouraged to explore material from historical or contemporary perspectives in the literature, perform and demonstrate special dissections, and discuss or present material on assigned topics. Weekly journal club meeting on selected topics provide an opportunity for students to discuss papers under faculty supervision. These sessions expose students to methods and experimental studies outside the mainstream of their laboratory setting. The journal club provides experience in critical review of literature with a focus on experimental design and presentation and interpretation of data. Faculty participation in these discussions helps broaden students' perspectives.

Coursework	PhD		MS	
	Anatomy Track	Cell Biology Track	Anatomy Track	Cell Biology Track
ANA-513 Graduate Human Anatomy I (5)	16	3	10	3
ANA-514 Graduate Human Anatomy II (5)				
ANA-511 Graduate Histology (3)				
ANA-500 Introduction to Neurobiology (3)				
ANA-581 Research Methods in Anatomy/Cell Biology (3)	3	3	3	3
ANA-590 Special Topics in Anatomy/Cell Biology (1)	1+	3+	1+	3+
<i>Graduate College Core curriculum</i>				
GCC-501 to GCC-514 (Cell/Molecular Biology) (1 – 2 ea)	2	13	2	7
GCC-506 Biomedical Ethics (1)	1	1	1	1
GCC-507 Biomedical Statistics (2)	2	2	2	2
<i>Extra-departmental and other GCC courses; e.g.</i>				
BCH-624 Connective Tissue Biochemistry (2)				
BMC-501 Statics & Dynamics (3)				
BMC-511 Biomechanics (3)	2	2	2	2
BMC-512 Bioengineering Materials (3)				
BMC-513 Kinematics of Human Motion (3)				
GCC-593 Introduction to Grantsmanship (1)				
GCC-620 Introduction to Teaching (variable credit hours)				
ANA-591 Teaching Assistantship (variable credit hours)	Suggested	Suggested	Option	Option
ANA-595 Journal Club (1)	6	6	4	4
ANA-599 MS Research (variable credit hours)	N/A	N/A	8+	8+
ANA-699 Doctoral Research (variable credit hours)	59+	59+	N/A	N/A

Rush Medical College students who temporarily suspend their studies to pursue a degree in Anatomy and Cell Biology may have a modified plan of study based on courses they have completed as medical students.

Anatomy and Cell Biology: Thesis/Dissertation Process

Guidance

Each entering student is guided in his or her course of study by the program director with the assistance of the Graduate Advisory Committee until such time as the student determines a course of dissertation/thesis scholarship and selects a research advisor. The research advisor must hold an appointment in the Division of Anatomy and Cell Biology. The research advisor assists the student in development of a dissertation/thesis proposal, selection of a dissertation/thesis committee and oversight of the dissertation research and writing. The student, in consultation with the research advisor and graduate program director, is responsible for assuring that his or her graduate coursework satisfies requirements of both the division and the Graduate College for completion of the degree.

Thesis Requirements for Master's Students

After completion of their coursework and initiation of their research, students identify a master's thesis committee (three members) and present their thesis proposal for review. The composition of the committee is governed by the Graduate College's Policy and Procedures document. This proposal is ordinarily scheduled toward the end of summer after their first year. Completion of the study, the thesis and its presentation and defense are to be completed by May in order to qualify for a June graduation.

Anatomy and Cell Biology: Candidacy Requirements for Doctoral Students

Preliminary Examination

After completing the course requirements, the student must take the preliminary examination in order to qualify for degree candidacy. This examination emphasizes the student's ability to synthesize material, to solve problems and to communicate verbally and in writing. The first part of this examination consists of a written, comprehensive examination on course material. The second part, an oral examination, is based on the student's dissertation proposal.

Dissertation

Upon completion of both parts of the preliminary examination, the degree candidate devotes his or her time mainly to dissertation research and writing. The dissertation must be an original experimental or applied study; its format and review must comply with requirements of the Graduate College. The candidate

must present the work in a University-wide forum and defend the completed dissertation before his or her research committee. This dissertation committee should be composed of five members with at least one member from outside the division. An extra-mural committee member is recommended. The composition of the committee is governed by the Graduate College's Policy and Procedures document.

Anatomy and Cell Biology: Advanced Placement

The programs in Anatomy and Cell Biology are well-suited to medical students interested in pursuing an MS or PhD degree because of significant overlap in required coursework for these programs. Exemptions are ordinarily permitted for courses taken as medical students at Rush (or possibly other institutions), subject to review by the departmental Graduate Advisory Committee.

The MS for medical students provides an opportunity for students to engage in research training and to fulfill the thesis requirement without significant additional coursework. The thesis research is completed in one additional year, ordinarily between the student's second and third medical school years. This training is significant for students seeking academic careers in medicine as physician-scientists but whose specialty interests require extended residency programs and post-residency fellowship commitments.

The PhD program would typically follow a traditional 2-3-2 plan, with three years devoted to doctoral study between the medical preclinical and clinical programs. Students interested in pursuing a PhD degree should contact the program director to discuss the opportunities and application procedure.

MS with Advanced Placement

An advanced placement track is available for residents or clinical fellows who may be afforded extended time to pursue research. Students or graduates of Rush or accredited U.S. or Canadian medical schools are eligible for this advanced placement track. The Graduate Record Examination (GRE) is ordinarily required, although applicants can petition for an exemption based on their MCAT scores. Proficiency exams administered by the program may be required to validate competency in certain areas or to help set up program plans. International medical graduates will be considered on a case-by-case basis. Their eligibility is based on TOEFL and GRE scores as well as undergraduate medical records and recommendations. The advanced placement track recognizes the medical course background of the applicants by exempting them from anatomy, histology and neurobiology

course requirements. The emphasis is on research, laboratory-based training and project development with the completion and defense of their master's thesis.

Anatomy and Cell Biology: Tuition Scholarships, Stipends and Employment

Tuition Scholarships/Stipends

Tuition scholarships are provided for all doctoral trainees along with stipend support equivalent to NIH guidelines and according to Graduate College's Policy and Procedures for predoctoral fellowships. No tuition forgiveness or stipends are provided to master's students. Tuition and stipend for MD students pursuing an MS degree are based on Graduate College's Policy and Procedures and resources available to the department and the advisor.

Paid Employment

Outside employment is not permitted under ordinary circumstances. A student who desires to work or needs to work for financial or other reasons is first advised to discuss his or her situation with the research advisor, who can best assess potential issues that may relate to conduct of research or other degree requirements. If the student cannot resolve the situation with his or her advisor, the student may petition the program director to help arrive at a recommendation that is in the student's best interest. In any case, the program director should be apprised of any instances of employment.

Anatomy and Cell Biology: Research Activities

Research in the Department of Anatomy and Cell Biology stresses the pathobiology of tissue repair and regeneration in connective tissue (especially bone and cartilage), the eye and cancer biology. Many of these studies are directed to developing modes of protection against injury or finding ways that growth factors and cytokines can promote healing in experimental models. Biomedical projects closely allied to problems encountered in the clinical setting are enriched by collaborative work with the Departments of Orthopedic Surgery, Biochemistry and Ophthalmology and the Section of Rheumatology. Students are encouraged to perform research in cross-disciplinary areas to take advantage of opportunities in the medical environment at Rush to develop basic research problems with a disease orientation. In addition to the biomedical research detailed below, faculty members have interests in the development of new educational constructs that use computers to facilitate instruction

and applied learning through case study work. Faculty laboratories are located in the Armour Academic Center and Jelke Building. These laboratories support a variety of projects ranging in scope from cell and tissue culture work using molecular probes and biochemical methods to experimental surgery and studies on biomechanics and gait. There is ready accessibility of scanning and transmission electron microscopy, a confocal microscope, mechanical testing equipment and a bioinstrumentation laboratory as well as opportunities in specialty laboratories throughout the Medical Center. Most faculty members collaborate not only with other researchers at Rush but with investigators elsewhere in the United States and abroad.

In this small department, a premium is placed on close relationships between students and their faculty mentors for guidance in development of new projects. The department normally hosts post-doctoral MD or PhD investigators who are committed to related lines of investigation and who are valuable resources for students. Highlights of faculty research interests in the department are as follows.

Bone Biology and Orthopedics

Methods of enhancing bone regeneration for improving fixation of orthopedic implants (e.g., for joint replacement) are being investigated in experimental models and in patients. These studies feature mechanisms by which bone adapts to altered mechanical stresses and to the presence of foreign materials in these devices. The role of growth factors and cytokines is being studied in these models. (Sumner, Viridi)

Bone Biology and the Bone Marrow Stroma

Mesenchymal stem cells in the bone marrow stroma can give rise to a number of cell lineages, including osteogenic, chondrogenic, myogenic and adipogenic. Isolation and characterization of the early progenitors has a great potential for their use in clinical situations of tissue repair and regeneration. Our research interests focus on molecular studies using gene-expression profiling and the role of these cells as vehicles for delivering growth factors to the site of repair. (Viridi, Sumner)

Joint Pathophysiology

The pathophysiologic processes that produce damage to joints and articular cartilage are being examined in experimental models. Possible approaches to protecting cartilage from damage and inducing cartilage repair are being studied as a means to restore articular surfaces damaged by trauma or osteoarthritis. The role of bone in the development and progression of osteoarthritis is controversial. Several of our recent studies have suggested that bone may play a critical role. (Williams, Sumner, Thorp)

Movement Disorders

The faculty investigator and a team of collaborators are investigating (1) balance, gait and functional mobility deficits in neurodegenerative disorders as well as the identification of potential functional markers for early detection of such disorders, and (2) novel technologies to measure hyperactive motion including repetitive, stereotyped movements in individuals with fragile X syndrome and autism as potential outcome measures in future therapeutic intervention trials. (O'Keefe)

Cartilage Biology and Bone Growth

The long-term goals of this research area is to understand the molecular mechanisms that govern chondrocyte maturation (hypertrophy) during skeletal development, and to identify putative therapeutic targets that regulate chondrocyte maturation and are therefore involved in the pathogenesis of related skeletal dysplasias and/or osteoarthritis. Current projects are focused on identification of transcriptional determinants that mediate tissue-specific mouse Col10a1 expression in hypertrophic chondrocytes in vivo and characterizing the role of Runx2, AP-1 (Activator Protein-1) and other putative transcription factors in late endochondral bone formation. (Zheng)

Ocular Lens

The structural basis of lens opacification (cataract), lens structure/function relationships as a consequence of aging, cataract formation and ocular/systemic diseases and fiber cell elongation/migration in normal lens and models of cataract are being investigated. (Al-Ghoul)

Cancer Research

Dissemination of cancer cells from primary tumor to distal organs (e.g., bone, lungs) is the primary cause of cancer-related deaths. A compelling and therapeutically relevant question is how cancer cells acquire a metastatic phenotype and escape from the primary tumor. Research interests focus on the understanding the role of transcriptional regulatory networks operative during cancer progression and metastasis to bone using various approaches (molecular, biochemical and imaging), and in vitro and in vivo models of cancer metastasis. (Pratap)

Cancer stem cells are highly metastatic and play a key role in tumor recurrence and resistance to radiation and chemotherapy. Cross-talk between the sonic hedgehog signaling pathway, heparanase, and PI-3 kinase signaling pathway is implicated in promoting cancer stem cell self-renewal and tumor cell invasiveness. Studies in the Xu laboratory focus on identifying the role of these signaling pathways in tumorigenesis and metastasis of thyroid and breast cancer and targeting these signaling pathways for cancer treatment and prevention. (Xu)

Osteosarcoma is the most common malignant bone cancer in children. Current treatment includes aggressive preoperative and postoperative multidrug chemotherapy. Nonetheless, it is estimated that 30% of patients with localized disease and 80% of patients with metastatic disease at diagnosis will relapse. Recurrent tumors are thought to arise from therapy-resistant cancer cells that survive the initial treatment. Determining the molecular basis for chemotherapy resistance should allow one to more effectively target these therapy resistant cells. The tumor suppressor protein p53 is activated and triggers cell death pathways in response to DNA-damaging chemotherapeutic drugs. More than 50% of cancers harbor inactivating mutations in p53, and in many cases mutations in p53 have been linked to a diminished response to chemotherapy. A long-term goal in the Maki lab is to identify molecular mechanisms responsible for therapy resistance in osteosarcoma and other cancers, and then use this information to more effectively target resistant cells. (Maki)

Biochemistry

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS students, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Biochemistry: Philosophy/Division Overview

The Division of Biochemistry offers master's (MS) and doctoral (PhD) degrees with a major in biochemistry. All recipients of these degrees acquire a thorough knowledge of normal biochemical processes that take place in the human organism, leading to the development of knowledge and skills of potential benefit to health care delivery. The doctoral degree is awarded following the successful defense of a research dissertation, which demonstrates the ability of the student to perform and present original scientific work. Prior to this, the student must have completed all course requirements with a minimum average grade of "B" (3.0/4.0) and passed the PhD preliminary examination.

The goals of the graduate program in the Division of Biochemistry are to provide high-quality education, practical training and research opportunities to students interested in practicing basic and applied medical biochemistry at molecular

and cellular levels. The term *medical biochemistry* has often been applied to describe the division's scholarly direction. The division thus endeavors to develop those professionals who, through their research activities, will substantially improve health care delivery to the public. The program trains students in the application of chemical, physical and molecular biological methods and principles to the solution of biological problems, especially those of biomedical importance. A graduate of the biochemistry program should have the knowledge, skills, perspectives and understanding to produce quality, self-directed scientific work. Since it is a time of enormous and rapid advances in biochemistry and molecular biology, the knowledge and skills taught in the program are soon replaced or augmented. Thus, the Division of Biochemistry endeavors to train the student to recognize and utilize the interaction between observation, experiment and theory. Most importantly, the candidate should also demonstrate that oral, written and visual communication skills have been acquired.

Biochemistry: Admission Requirements

Students are admitted only in the fall semester. Applications may be submitted at any time during the year. Application review begins in early winter, and the number of doctoral stipends is limited. Applications for admission to the program will be evaluated by the Graduate Program Committee of the Division of Biochemistry and, in special cases, the Graduate College Council. Applicants are encouraged to visit Rush University for an interview. Consideration for admission will include overall academic record, results of the Graduate Record Examination (GRE), letters of recommendation and especially interview results. Students must meet all Graduate College requirements. Medical students seeking an MS or PhD in biochemistry must take a leave of absence from medical school and be formally accepted to the applicable program in the Graduate College.

Transfer students with an advanced degree in science may, upon the recommendation of the Graduate Program Committee, be admitted to the graduate program in biochemistry with advanced standing. The extent of advanced credit will be determined by the Graduate Program Committee on an individual basis through its credentials subcommittee. All advanced level entrants are urged to see the credentials subcommittee before matriculation.

Minimum requirements for admission to the graduate program include a bachelor's degree in any scientific discipline with a minimum grade point average (GPA) and GRE scores as defined by the Graduate College. More specific departmental course requirements are as follows: one year of general chemistry, one

year of organic chemistry, one semester or quarter of analytical chemistry or physical chemistry, one year of general biology, one year of molecular, cellular or advanced biology, mathematics through calculus and one year of physics. At least one semester of biochemistry is highly recommended but not required. Students may be accepted with less than the minimum course requirements upon special action of the Graduate Program Committee, which may waive such requirements or require that the deficiency be rectified during the student's first year of graduate study.

Biochemistry: Curriculum

The PhD degree is a research degree conferred in recognition of proficiency in research, breadth and soundness of scholarship and a thorough acquaintance with a specific field of knowledge as determined by the faculty. To attain these goals, the curriculum includes the following:

- Graduate College core curriculum courses (GCC courses), which provide a common knowledge base in molecular and cell biology for most graduate students in all divisions
- A core of required biochemistry courses (BCH courses), which provide the basis for the students to pursue their own specialized biochemistry research programs
- A variety of elective courses, which provide the students with the flexibility to tailor their coursework to their research interests or needs
- Initiation of research as soon as possible in the student's first academic year

During the first year, the student will complete all required biochemistry and Graduate College core curriculum courses. By the end of the second year, the elective course requirements should be completed.

At the end of the summer term of the student's first academic year (usually at the beginning of September; the academic year begins with the fall semester), the student sits for the preliminary examination, which is a combination of a written examination, a take-home examination and an oral examination. By the end of his or her second academic year (i.e., before the fall semester of the student's third academic year begins), the student is required to submit and defend a written dissertation proposal before the student's Dissertation Advisory Committee. Following this, the successful student continues his or her research work, as approved by the Dissertation Advisory Committee.

When the student's advisor and his or her Dissertation Advisory Committee agree that the student has completed his or her task, which is evaluated at an announced "Permission to Write Meeting," he or she writes a dissertation, which is defended in a public seminar and in a separate executive session with the student's Dissertation Examination Committee. Another requirement is that one or more manuscripts, based on the student's dissertation work, be published, accepted or submitted for publication in a full-length peer-reviewed journal, with the student listed as first author. To participate in the May commencement ceremony, all requirements for the PhD degree must be met by the beginning of the month.

Required Formal Courses for the PhD Degree

Any portion of this may be waived for advanced students on a case-by-case basis as recommended by the Credentials Subcommittee.

Semester Hours Required

Total credit hours required for full-time student status and for graduation are determined by the Graduate College. The student must check with the Office of the Registrar before anticipated graduation as to whether or not all formal Graduate College requirements have been met.

BCH-571	Medical Biochemistry	3
BCH-581	Biochemical Methodology I	3
BCH-582	Biomedical Methodology II	3
BCH-595	Journal Club	1 (per year)
BCH-624	Connective Tissue Biochemistry	2
BCH-698	Introduction to Research	1
GCC-501	Molecular Biology: Genome to Proteome	2
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	2
GCC-503	Functional Cell Biology	1
GCC-504	Functional Tissue Biology	2
GCC-506	Research Ethics	1
GCC-508	Writing Practicum	2
GCC-511	Readings in Molecular Biology	1
GCC-512	Readings in Cellular Biochemistry	1
GCC-513	Readings in Functional Cell Biology	1
GCC-514	Readings in Functional Tissue Biology	1
	Electives	7
	Research (BCH-699 or -598)	11
Total Hours of Required Coursework, less BCH-595 hours:		45

A full-time student registers for a minimum of 12, 10, or 9 credit hours each semester depending on the semester. Credit hours not allocated to formal courses are made up by BCH-699, Biochemistry Doctoral Research, for PhD students or BCH-598, Biochemistry Master Research, for MS students. A student, however, should register for at least one BCH-699 or BCH-598 credit each semester even though the student may not have begun laboratory research. A student not taking any formal courses must register for enough hours in BCH-699 or BCH-598 to be a full-time student. The seven elective hours may be selected from other courses offered by the Division of Biochemistry or from coursework offered by other divisions, including those of other universities. Electives can be taken only after consultation with the student's advisor and the Director of Graduate Education and final approval by the director. Most required courses taken by the student must carry a letter grade ("A," "B," "C" or "F"); however, BCH-698, Introduction to Research; BCH-598, Biochemistry Master's Research; BCH-699, Biochemistry Doctoral Research; and some BCH-595, Journal Club, credits are taken for a pass/no pass grade. Students must obtain a grade of "B" or better in BCH-571, which is considered the biochemistry core course. Elective courses may be taken for a letter grade or a pass/no pass grade. Graduate students must maintain at least a "B" average (3.0) to remain in good academic standing in the Graduate College. The department's seminar program and the weekly workshops are to be considered as part of a student's research experience. Attendance at seminars is mandatory throughout the entire graduate study at Rush. Attendance at the workshops is highly recommended since these sessions can greatly help a student prepare for and conduct the dissertation work. Since many of the themes presented at the workshops relate to dissertation projects, students may be queried as to their knowledge of seminar and workshop presentations at their preliminary examination or their dissertation progress meetings.

Suggested Program

A suggested program for the PhD student is displayed herein. Please note that all required courses are to be taken in the first and second years of the student's tenure at Rush University. Electives are normally taken during the second year. A research advisor should be selected by the end of the second semester of the student's first year, or earlier. Students are expected to remain on campus during the summer term as full-time students taking BCH-699 (unless taking a formal course). The summer term provides a welcomed opportunity to do uninterrupted research work. Reasonable vacation time is permitted after consultation with the student's advisor and two weeks are allowed annually, according to NIH fellowship guidelines. The program of study for MS students is similar to that for PhD students except that master's students register for BCH-598, Biochemistry Master's Research,

instead of BCH-699. Master's students do not take a preliminary examination. The MS program should be completed in two years, where the first year is devoted primarily to coursework and the second year to MS research.

Suggested Program of Study for PhD Students

Year 1		HR
Fall Semester		
BCH-581	Biochemical Methodology I	3
BCH-698	Introduction to Research	1
BCH-699	Research in Biochemistry	1
GCC-501	Molecular Biology	2
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	2
GCC-511	Readings in Molecular Biology	1
GCC-512	Readings in Cellular Biochemistry	1
Spring Semester		
BCH-571	Medical Biochemistry	3
BCH-582	Biochemical Methodology II	3
BCH-699	Research in Biochemistry	1
GCC-506	Research Ethics	1
GCC-503	Functional Cell Biology	1
GCC-513	Readings in Functional Cell Biology	1
GCC-504	Functional Tissue Biology	2
GCC-514	Readings in Functional Tissue Biology	1
BCH-624	Connective Tissue Biochemistry	2
BCH-595	Journal Club	1
BCH-699	Research in Biochemistry	1
GCC-508	Writing Practicum	2
	Select Advisor	
Summer Term		
BCH-699	Research in Biochemistry	9
	Preliminary Examination	
Year 2		
Fall Semester		
BCH-699	Research in Biochemistry	6
	Electives	3
Spring Semester		
BCH-699	Research in Biochemistry	5
	Electives	3
BCH-595	Journal Club	1
	Dissertation Proposal	
Subsequent Years		
BCH-595 (Journal Club) each spring semester, any additional electives, and BCH-699 to give a total of 9 credit hours each term until a successful dissertation defense.		

Biochemistry: Academic Policies

Statute of Limitations and Leaves of Absence

A student must complete his or her PhD degree requirements within five years of matriculating to Rush in the Department of Biochemistry, excluding any leaves of absence. Extensions of this limitation may be granted under unusual circumstances on a semester-by-semester basis upon petition to the Director of Educational Programs, who will act based on the advice of the Graduate Program Committee.

Extramural Experience

Selected students will have an opportunity to spend one semester in a basic science research laboratory in an industrial organization or another recognized research institution of higher learning in the United States or Europe. It is expected that work in the extramural laboratory will aid the student in his or her dissertation research work. The students will be selected for this experience upon written application to the Director of Graduate Education through guidelines established by the Division.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Biochemistry: Tuition Waivers/Stipends

The Graduate College determines tuition for full-time graduate students; however, tuition has historically been waived for students in a PhD program. Students in an MS program pay tuition. Most PhD students receive a research scholarship (stipend), while MS students do not. The research scholarship awarded to PhD students is a privilege, which is contingent upon satisfactory academic progress on the part of the student. No special application for this stipend need be made; the applicant must merely indicate in his or her cover letter that such a stipend is desired. Additional financial aid, including loans, is available through the Rush University Office of Student Financial Aid. It should be noted that the student is expected to be a full-time student. Part-time jobs are highly discouraged. The advisor (who will then inform the Director of Graduate Education in writing) must approve any special circumstances that necessitate a part-time job. It is intended that graduate students receive their stipends from the Division of Biochemistry until the student has passed his or her Preliminary Examination and, at the end of

the first academic year, has selected a permanent advisor. From that time on, it will be the obligation of the student's advisor to provide the student with financial support, including a stipend, from his or her extramural research funds as the student can now devote more time to research.

The research scholarship (stipend) is awarded to students for a period of five years with the understanding that they will devote their full time to graduate study activities and that they will make satisfactory progress toward the PhD degree. "Satisfactory progress" includes, but is not limited to, pursuit of the prescribed didactic course program, identification of a research advisor by the end of the second semester, passing the preliminary examination in the fall of their second academic year, presenting a research proposal by the end of the second academic year as specified by departmental rules and regulations, and pursuing research activities toward the student's dissertation with due diligence and effort. The Graduate College has mandated that the PhD must be awarded within seven years following matriculation. However, the Division of Biochemistry will enforce a five-year deadline, but will allow extensions that are justified and approved by the Graduate Program Committee.

Biochemistry: Research Interests

Members of the Division of Biochemistry's faculty conduct a broad range of extramurally funded research activities. Many faculty members focus their research efforts on cartilage tissues, synovial joints and arthritic diseases. A strong interaction exists between practicing clinicians and members of the Division of Biochemistry, and sometimes leads to a full consolidation of research programs. The diverse interests of the faculty provide investigative expertise in the areas of connective tissue biochemistry, etiology of arthritis, animal models of arthritis, joint imaging, regulation of gene expression, cytokines and growth factors, signal transduction, biomechanics, tribology, musculoskeletal cell biology, cancer cell biology, cell membrane and lipid biochemistry and the application of clinical biochemistry to medical problems. Some of these research programs are joint efforts with other departments, giving the student an opportunity to interact with investigators in other disciplines as well as with clinicians and physician scientists. The departmental laboratories are fully equipped with instrumentation required for modern research in biochemistry, tissue culture and molecular biology.

MASTER OF SCIENCE IN BIOMECHANICS

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Biomechanics: Philosophy

The Master of Science in Biomechanics program is designed to educate bioengineers in a clinical setting who will participate in the conduct of research to improve orthopedic care. Graduates of this program can collaborate with other researchers to perform high-quality, up-to-date research in orthopedic biomechanics at colleges and universities, government agencies and orthopedic-related industries. Graduates can also use this as a stepping stone towards obtaining a PhD degree in biomechanics after gaining appreciable practical experience either in the orthopedic industry or research institutions conducting high-quality musculoskeletal biomechanics research. Students in the program will work with faculty and scientists from different divisions at Rush University such as the Divisions of Biomechanics, Biochemistry, Anatomy, Physiology and Molecular Biophysics to learn essential skills in research methods, data analysis and descriptive and inferential statistics applied to the biological and engineering aspects of musculoskeletal biomechanics. The program of study involves formal courses in biomechanics, biomaterials, anatomy, tissue and cell biology, research methods and biostatistics. As a part of the program, students must complete a research project that culminates in a thesis.

Specific objectives of the program are to: 1) train bioengineers in the application of biomechanics to clinically related musculoskeletal problems through "bench to bedside and back again" research that improves orthopedic care; 2) provide bioengineers with core competencies needed for the design and analysis of clinical biomechanical problems in the field of orthopedics; and 3) provide bioengineers the foundation that is needed to assume professional leadership roles in a variety of settings for research and design in the area of orthopedic biomechanics.

The master's degree is very much a viable diploma, independent of the PhD qualification. Local industry leaders and employers have reported through interviews with faculty in our Graduate College that they have a greater need for MS-prepared individuals to work in their laboratories. Graduates of the master's program will be qualified to work in orthopedic-related industries, hospitals, government and nonprofit agencies to assist in the design of biomechanical devices and evaluate their effectiveness. MS graduates are more likely to assume positions in industry.

Biomechanics: Admission Requirements

Applicants must enter the program in the fall semester in order to begin the required coursework in the core curriculum. The deadline for submission of applications is generally March 1. International applications can be accepted after March 1 but must take into consideration the delays associated with the necessary visa arrangements. In addition to the basic requirements established by the Graduate College, the division has the following requirements for admission to its program:

- Applicants must have completed a baccalaureate degree or higher from a regionally accredited college or university and provide official transcripts from each college or university attended. Prior degrees would most likely include physical sciences, engineering, computer science, mathematics, biology or medicine, although students with degrees from other areas and those who consider themselves to have special or unique qualities and a reasonable likelihood of success are also encouraged to apply.
- The Graduate College requires academic transcripts from all baccalaureate and post-baccalaureate educational experiences. These should provide a minimal grade point average of 3.0 overall (A = 4.0). The Graduate College requires all graduate students to take the GRE examinations; scores on these tests are considered by the admission committee. All applicants whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL). Applicants from foreign countries must have their transcripts evaluated by an independent agency (i.e., ECE and WES).
- As required by the Graduate College, a clear, concise expression of the applicant's interests and goals needs to be included as an essay in the application. Identifying a particular area of interest within the field of biomechanics is very helpful in identifying potential laboratories for the students.
- The Graduate College requires three letters of recommendation, and it is recommended that they be from science faculty who can evaluate the character of the applicant, the applicant's academic and research performance, and the applicant's ability to think and work independently.

The division director and the Admissions Committee evaluate applications. All prior academic experience and the letters of recommendation will be evaluated for an indication of the applicant's potential for success as a graduate student and future independent investigator. The statement by the applicant describing goals and motivation will be studied to determine the compatibility between the applicant's requirements and the capabilities of the graduate program.

The number of faculty available to mentor the student's research limits acceptance into the master's program. Students are therefore encouraged to apply early. Generally, students entering the master's program will not be eligible for stipends and must pay tuition. Under certain circumstances, if the faculty has sufficient funds, it may provide financial support to the extent of tuition.

Biomechanics: Curriculum

When the applicant enters the program, a research advisor is assigned and the student begins directed research on an active project. In the first three semesters, there is minimal research as classroom studies are emphasized. During these semesters, master's Graduate College students take the Graduate Core Curriculum (GCC) classes, required biochemistry (BCH) courses and required biomechanics (BMC) courses. The summer semester is devoted to MS thesis research. Research and advanced biomechanics courses provide the core of the second-year studies. The master's students are involved in a directed research project.

A typical course sequence is described as follows:

Year 1		
Fall Semester		
BMC-501	Statics and Dynamics	3
BMC-502	Strength & Properties of Materials	3
BMC-505	Anatomy/Musculoskeletal System	3
GCC-502	Cellular Biochemistry	2
GCC-512	Reading in Cellular Biochemistry	1
Spring Semester		
BMC-511	Biomechanics	3
BMC-513	Kinematics of Human Motion	3
BMC-512	Bioengineering Material	3
GCC-506	Research Ethics	1
BCH-624	Connective Tissue Biochemistry	2
Summer Semester		
BMC-503	Introduction to Research	1
BMC-504	Journal Club	1
BMC-521	MS Thesis	7
Year 2		
Fall Semester		
BMC-514	Spine Biomechanics	3
GCC-546	Statistics	2
BMC-521	MS Thesis	7
Spring Semester		
BMC-521	MS Thesis	6
GCC-508	Writing Practicum	2

GCC courses are Graduate College courses taken by master's students from a variety of different Graduate College programs. These courses provide a basic understanding of the biomedical sciences and acquaint the students with the biomedical literature. BCH-prefixed courses are specific to the Division of Biochemistry. BMC-prefixed courses are specific to the Division of Biomechanics.

The Division of Biomechanics reserves the right to revise courses, and the student may be required to take the replacement courses. Such a requirement would not apply to students who have already taken a course.

Minimal Credit Hours Required for MS Degree

The MS program in biomechanics will require a minimum of 53 semester hours of academic coursework taken at the graduate level that consists of core courses in biomechanics, strength and properties of biomaterials, basic anatomy and cellular biochemistry (15 semester hours); research core courses in biostatistics, writing practicum, ethics and journal club and introduction to research (7 semester hours); professional track courses in connective tissue biochemistry, kinematics of human motion, bioengineering material and spine biomechanics (11 semester hours); and thesis work (20 semester hours). The program may be completed in approximately 2 years of full-time study.

Research Requirements (Thesis)

All MS students must complete a thesis as a part of the degree completion requirements. The thesis is completed through faculty-guided research. The thesis may be original or an important extension of an existing theory/principle and cannot have been used to meet the requirement of any other degree, either at Rush University or at any other university. Each student will have a thesis committee whose role is to assure that the student's thesis is of high quality and meets the standards of the division, the college and the University. The thesis committee is chosen by the student in conjunction with the student's primary advisor and should consist of at least three total members to include the student's primary advisor. The primary advisor must be a member of the Graduate College. Once the committee convenes, it will choose a chairperson, who cannot be the student's primary advisor. The chairperson will oversee the scheduling and activities of the committee.

Biomechanics: Thesis Program Progression

During the summer of the first year, the student selects a research project in conjunction with a faculty mentor. The research project is designed to advance knowledge in a specific

discipline and to yield a scientific publication for the student. The thesis may be original or an important extension of an existing theory/principle and cannot have been used to meet the requirement of any other degree, either at Rush University or at any other university.

Academic Advisor/Principal Advisor

The graduate division director functions as the academic advisor to the student during the first year. The program director determines the course schedule and monitors the student's progress. In the summer, a principal advisor or mentor is selected from the faculty of the Division of Biomechanics. The advisor then accepts the supervisory role in the development of the student as a scientific investigator.

Thesis Research

The advisor will work with the student to develop a research project that can be completed within the framework of the program. Each student will have a thesis committee whose role is to assure that the student's thesis is of high quality and meets the standards of the division, the college and the University. The thesis committee is chosen by the student in conjunction with the student's primary advisor and should consist of at least three total members to include the student's primary advisor. The primary advisor must be a member of the Graduate College. Once the committee convenes, it will choose a chairperson, who cannot be the student's primary advisor. The chairperson will oversee the scheduling and activities of the committee.

Master's Thesis

A written thesis, describing work accomplished, is required to be completed by all master's students by the end of the second year. The thesis committee reviews the thesis. At or near the completion of the thesis, each student will share, by means of a seminar with the academic community, the knowledge that the student has developed. Students are responsible for posting announcements (at least two weeks prior to the presentation) on institutional bulletin boards and emailing all faculty and students of the Graduate College the title of the thesis; the student's name; and the location, date and time of the presentation. This presentation must precede the final approval of the written thesis by the thesis committee. Following the approval of the thesis committee, the program director must certify the completion of the thesis and all requirements for the MS degree. The director of the Library of Rush University Medical Center must then approve the formatting of the thesis before its acceptance by the Library of Rush University.

Completion of the Degree

The Office of the Registrar must be notified of impending completion of the degree by submission of an Intent to Graduate form at the beginning of the final semester. Information for graduation can be found in the University Catalog. As the thesis is reaching final form, the student should consult with the University Librarian to assure that the thesis will be formatted correctly. Upon thesis approval, the student completes a final checklist to assure the necessary approvals. During this time, the student will be required to have an exit interview and provide the college with feedback concerning his or her experience at Rush University.

Biomechanics: Graduation Requirements

The student must complete all required courses except for those waived by the Graduate Committee and have completed the minimally required course hours as detailed in the curriculum section. The student's committee must approve the thesis and have the completed document accepted by the graduate program director and the University librarian.

DOCTOR OF PHILOSOPHY IN BIOMECHANICS

Biomechanics PhD: Philosophy

The PhD in biomechanics is designed to educate bioengineers in a clinical setting to perform "bench to bedside and back again" research that improves orthopedic care. This program will train engineers/scientists in the application of biomechanics to clinically related musculoskeletal problems with the help of faculties from different divisions at Rush University such as the Divisions of Biomechanics, Biochemistry, Anatomy, Physiology and Molecular Biophysics. Graduates of this program will perform high-quality, cutting-edge research in orthopedic biomechanics at colleges and universities, government agencies, hospitals, and nonprofit agencies and in orthopedic-related industries. Students in the program will work with faculty and scientists to generate new knowledge in the field of musculoskeletal biomechanics through the application of sophisticated research methods and statistics. The program of study involves formal courses in biomechanics, advanced biomaterials, anatomy, bone biology, tissue and cell biology, techniques in biomedical sciences, implant design, tribology of implants, kinematics of human motion, spine biomechanics, ethics, research methods and biostatistics. As a part of the program, students must complete a comprehensive written preliminary examination on fundamental

principles related to biomechanics, design and conduct research that culminates in a dissertation, and disseminate their findings through scholarly publications and presentations.

Specific objectives of the program are to: 1) train bioengineers in the application of biomechanics to clinically related musculoskeletal problems through "bench to bedside and back again" research that improves orthopedic care; 2) provide bioengineers with core competencies needed to design research projects and analyze clinical biomechanical problems in the field of orthopedics; and 3) provide bioengineers the foundation that is needed to assume professional leadership and research roles in the area of orthopedic biomechanics across a variety of settings

Biomechanics: Admission Requirements

Applicants must enter the program in the fall semester in order to begin the required coursework in the core curriculum. The deadline for submission of applications is generally March 1. International applications can be accepted after March 1 but must take into consideration the delays associated with the necessary visa arrangements. In addition to the basic requirements established by the Graduate College, the division has the following requirements for admission to its program:

Applicants must have completed a baccalaureate degree or higher from a regionally accredited college or university and provide official transcripts from each college or university attended. Prior degrees would most likely include physical sciences, engineering, computer science, mathematics, biology, or medicine, although students with degrees from other areas and those who consider themselves to have special or unique qualities and a reasonable likelihood of success are also encouraged to apply.

Admission criteria include completion of all prerequisite courses with a minimum grade of 3.0 on a 4.0 scale; an overall cumulative grade point average (GPA) of 3.0 on a 4.0 scale; a minimum combined Verbal and Quantitative score of 1000 on the Graduate Record Examination (GRE); three letters of recommendation from persons who are knowledgeable about the quality of the applicant's scholarly activities and/or work experience; an essay including the applicant's personal statements and future goals; and an application fee. Additional factors influencing admission to the programs include professional work experience; positions of leadership held; and communication and writing skills (as demonstrated in the personal statement essay). Specific admission requirements may be waived by the Graduate College Council. These will be addressed on a case-by-case basis.

Prerequisite coursework includes (but is not limited to) General Physics and Chemistry; Algebra, Calculus, and Differential Equations; Introductory Biology and Biochemistry, Introduction to Physiological Systems; Bio-Instrumentation; Properties of Material; Fundamentals in Statistics; and Dynamics and Senior Design.

The PhD program in biomechanics will target applicants who are practicing bioengineers from industry or health professionals and individuals with backgrounds in biology and medical physics. The PhD program will also be available to eligible master's-prepared junior faculty members of Rush University, providing them a mechanism for obtaining their doctoral degrees.

Acceptance of Transfer Credit

30-45 credit hours of graduate credit may be transferred into the PhD program with approval of the Section Director for students who are directly entering the PhD program after completing a baccalaureate degree. Graduate transfer credit may be given for graduate level courses taken at other institutions if approved by the major advisor and Section Director and if they are judged to meet divisional requirements. Courses taken outside of the United States may be considered for transfer with the approval of the Section Director. All such courses must be evaluated by the Educational Credential Evaluators (ECE) and be judged equivalent by U.S. standards. Academic credit for life experiences will not be given.

The Division Director and the Admissions Committee evaluate applications. All prior academic experience and the letters of recommendation will be evaluated for an indication of the applicant's potential for success as a graduate student and future independent investigator. The statement by the applicant describing goals and motivation will be studied to determine the compatibility between the applicant's requirements and the capabilities of the graduate program.

The number of faculty available to mentor the students' research limits acceptance into the master's program. Students are therefore encouraged to apply early. Generally, students entering the master's program will not be eligible for stipends and must pay tuition. Under certain circumstances, if the faculty has sufficient funds, it may provide financial support to the extent of tuition.

Biomechanics: Curriculum

The PhD in biomechanics will require a minimum of 132 semester hours of academic course work taken at the graduate level, consisting of core courses in biomechanics, strength and properties of biomaterials, basic anatomy and cellular biochemistry (15 semester hours); research core courses in biostatistics, writing practicum, ethics and journal club, introduction to laboratories, experimental design and models of research and introduction to research (11 semester hours); professional track courses in connective tissue biochemistry, kinematics of human motion, bioengineering material and spine biomechanics (11 semester hours); advanced topics such as non-linear tissue biomechanics, implant biomechanics, bone biology, advanced biomaterials and tribology of implants that will help the students to perform high-quality, up-to-date research in orthopedic biomechanics (18 semester hours); and doctoral dissertation work (74 semester hours). In addition, students will be able to further their knowledge in any subject using the 3 semester hours of elective or independent study. The program may be completed in approximately 4 years of full-time study.

Upon matriculation, the division shall provide the student with a handbook which contains information outlining:

- All course requirements with a year-by-year synopsis of recommended courses with course numbers
- Required grade performance for all required and elective courses
- Requirements for qualifying exams
- Description of the general content of the qualifying exam
- Process for passing qualifying exams
- Process for remediating qualifying exams
- Selection of an advisor
- Requirements for dissertation committee selection
- Expectations for research work
- Form of dissertation proposal
- Dissertation committee process
- Requirements for completion of degree
- Time line for degree completion and other materials relevant to the division not covered by the Graduate College student policies

A typical course sequence is described as follows:

Year 1		
Fall Semester		
BMC-501	Statics and Dynamics	3
BMC-502	Strength & Properties of Materials	3
BMC-505	Anatomy/Musculoskeletal System	3
GCC-502	Cellular Biochemistry	2
GCC-512	Reading in Cellular Biochemistry	1
Spring Semester		
BMC-511	Biomechanics	3
BMC-513	Kinematics of Human Motion	3
BMC-512	Bioengineering Material	3
GCC-506	Research Ethics	1
BCH-624	Connective Tissue Biochemistry	2
Summer Semester		
BMC-503	Introduction to Research	1
BMC-504	Journal Club	1
BMC-631	Doctoral Dissertation	7
Year 2		
Fall Semester		
BMC-514	Spine Biomechanics	3
BMC-611	Non-Linear Tissue Mechanics	3
GCC-546	Statistics	2
GCC-505	Introduction to Laboratories	2
BTN-525	Experimental Design and Models of Research	2
Spring Semester		
BMC-612	Advanced Strength of Materials	3
BMC-613	Implant Biomechanics	3
BMC-614	Bone Biology	3
BMC-615	Advanced Biomaterials	3
GCC-508	Writing Practicum	2
Summer Semester		
BMC-616	Tribology of Implants	3
BMC-699	Elective	3
BMC-631	Doctoral Dissertation	3
Year 3 and Year 4		
BMC-631	Doctoral Dissertation	64

Research Requirement

Research Dissertation (PhD) (74 semester credit hours total minimum requirement)

Students must choose an area of concentration in order to complete the dissertation requirements of the degree program. The overall aim of the dissertation is to make the students work on a clinically relevant topic in the following musculoskeletal biomechanics categories: Human Motion, Implant Design and Analyses, Spine Biomechanics, Bone Mechanics, Cartilage Mechanics, Biomechanics and Biochemical Analyses of Ligaments, Tendons and Muscles.

All doctoral students must complete faculty-guided independent research that culminates in a dissertation as a part of the degree completion requirements. The dissertation must be original and cannot have been used to meet the requirement of any other degree, either at Rush University or at any other university.

Each student will have a dissertation committee whose role is to assure that the student's dissertation is of high quality and meets the standards of the division, the college and the University for originality, contribution to the field and scholarly presentation. The committee is also to assure that the student is making satisfactory progress toward completion of the degree. The dissertation committee is chosen by the student in conjunction with the student's primary advisor and should consist of at least five total members that include the student's primary advisor. Two of the committee members and the primary advisor must be from the Graduate College. At least one member of the committee should be from outside of the division, and preferably from outside of the institution. Once the committee convenes, it will choose a chairperson, who cannot be the student's primary advisor. The chairperson will oversee the scheduling and activities of the committee.

Preliminary Examination

The PhD-seeking student is expected to attempt and pass a written and an oral examination (referred to as the preliminary examination) WITHIN the second year after admission to the program (summer of the 2nd year). The preliminary examination can be from coursework to examine the student's preparedness. The preliminary examination presentation format will closely follow that of the NIH grant application but excludes portions such as budget, resource statement, etc. The student is expected to provide some preliminary results and, more importantly, outline his or her research plan.

The preliminary examination committee consists of 5 faculty members (including the advisor and the division director). Specific requirements for the committee include: 1) at least one

member from outside the Division of Biomechanics and 2) at least one member from outside of Rush University and approved by the Divisional Graduate Program Committee (which will be formed as a program oversight body). The preliminary examination committee will, preferably, remain the same and become the final dissertation committee. The preliminary examination may be open to the academic community of the university. The committee must approve the research proposal.

During the course of the research work, each student must, annually, present his or her findings in a seminar.

At or near the completion of the dissertation, each student will share, by means of a seminar with the academic community, the knowledge that the student has developed and the findings obtained. Students are responsible for posting announcements (at least two weeks prior to the presentation) on institutional bulletin boards and emailing all faculty and students of the Graduate College the title of the dissertation, the student's name, and the location, date and time of the presentation. This presentation must precede the final approval of the written dissertation by the dissertation committee.

Upon completion of the public presentation, the student will meet with the dissertation committee to review the presentation, the dissertation document, and the student's preparedness to enter the scientific community. A majority of members of the committee must sign the dissertation certifying the completion of all requirements for the Doctor of Philosophy degree.

Admission to Candidacy for PhD

Admission to candidacy is evidence that the doctoral student has successfully completed all preliminary coursework and is prepared to move into his or her intensive research experience. Admission to candidacy is not completed until the student successfully defends his or her dissertation proposal. This proposal must be in the form of an R21 NIH application. Admission to candidacy is a demonstration of confidence that the student will successfully accomplish the remaining requirements of the program.

Practicum, Internship, Clinical or Field Experience Requirements

Internship or field experience with reputed implant manufacturers may help PhD students with their dissertation work.

Time to Completion of the Degree

Doctor of Philosophy (PhD) candidates are expected to meet all requirements for graduation within five enrolled academic years (excluding leaves of absence). This period begins the semester in which the student formally matriculates. A student exceeding

that time limitation must submit to the Graduate Council, in writing, a request to extend his or her candidacy beyond that time period. This request must identify the reasons for the extension and provide a written plan with reasonable deadlines for completion. This document will be co-signed by the student's advisor, section director and division director. The council will vote whether to accept the extension or not (passed by simple majority). The student's advisor will then provide an update on the student's progress after six months. One year after the extension is granted, the student is expected to complete all requirements. A second request may be made by the student's advisor and section director, but will only be accepted through a two-thirds majority of the voting members present at a formal hearing of the Graduate College Council. Within one year of that second request, the student must complete all requirements for the PhD degree or face dismissal. Alternatively, the student may be awarded an MS degree upon the recommendation of the student's graduate division.

Biomechanics: Academic Policies

The minimum satisfactory grade for course credit is "B," and all stipulated segments of a course must be passed by this standard. If a student earns grades lower than "B," or the student's overall GPA falls below 3.0, the student may not be permitted to register for subsequent courses or semesters without the approval of the section Committee on Progress and Promotions, and the student may be subject to probation, suspension or dismissal from the program. Students who withdraw or have been dismissed from the program may reapply and will be considered on the same basis as a new applicant.

Students requesting readmission must submit a letter to that effect to the Committee on Progress and Promotions.

Students are expected to attend all classes and spend the appropriate time in the lab. Outside employment is not allowed for anyone receiving a stipend because it interferes with the time and effort necessary to complete the program.

Each student is expected to conduct himself or herself at all times in a dignified manner—a manner which conforms to the ethics of the profession and which instills confidence in one's abilities as a working scientist. Irresponsible, unprofessional or unethical behavior, as determined by the instructor, may result in dismissal from the program.

The department will not condone cheating in any form. Allegations of cheating will be reviewed by the Committee on Progress and Promotions and, if merited, dealt with in a strict manner including immediate dismissal from the program.

Any student found to be cheating on an examination will automatically receive a "0" for the examination and, at the discretion of the Committee on Progress and Promotions, will be subject to dismissal from the program.

This Rush University catalog details the policies regarding inclusion of minorities and those with disabilities as well as the policies and procedures for reporting harassment.

The Division of Biomechanics follows the University Policies on Academic Honesty and the University Statement on Student Conduct.

Student Academic Appeals Policy

Numerous checks are in place to assure the fair treatment of students. Any student of the Graduate College may appeal a final course grade or failure of the thesis that results in his or her academic probation or dismissal from the University. A student may also appeal an unreasonable delay in graduation from the University.

The process for filing an appeal is maintained by each division.

Graduate College/ Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Biomechanics: Faculty Research Interests

Dr. Alejandro Espinoza develops methods to analyze joint/spine motion and loading patterns in both normal populations and those altered by degenerative conditions such as arthritis/disc degeneration or aging. His research focuses on analysis of structure-function relationships in bone and joints.

Dr. Nadim James Hallab is director of the Biomaterials Laboratory and is interested in the biocompatibility of orthopedic implants. He investigates: 1) implant debris, both ions, particles and metal-protein complexes, 2) implant degradation from corrosion and wear of modular junctions, 3) immune reactivity to implant debris, 4) cell toxicity responses to implant debris, 5) potentiodynamic surface optimization for directing cell bioreactivity, and 6) novel implant fixation and surgical techniques using in vitro mechanical testing.

Dr. Nozomu Inoue works on spine biomechanics, specifically the biomechanics of spinal surgery and the effect of degenerative changes of discs and facet joints on segmental instability

and motion. Currently his major research areas are development of 3D medical image-based computer models for quantitative analyses of spinal alignment and facet kinematics.

Dr. Joshua J. Jacob's interest is in analyzing biocompatibility of permanent orthopedic implants; corrosion and wear of metallic biomaterials; and clinical performance of joint replacement devices.

Dr. Hannah Lundberg combines novel computational and experimental modalities to better represent joint (natural and implant) function in vivo and improve surgical outcomes. Current emphasis is on using computer modeling to predict total knee replacement forces and behavior during everyday life.

Dr. Mathew Mathew's interest is in corrosion and tribocorrosion of biomaterials. Tribocorrosion is a combined study of wear and corrosion and their synergistic interactions in relation to orthopedic implants, particularly hip prostheses. The study has significant implications for patients with implants, which are exposed to mechanical articulation and are under an adverse chemical environment in vivo (infections, varying pH levels, etc.). He is also a research assistant professor at the College of Dentistry of the University of Illinois at Chicago. He leads the tribocorrosion research in dentistry (dental implants and temporomandibular joints) and is actively involved in the Institute of Biomaterials, Tribocorrosion and Nanomedicine.

Dr. Raghu Natarajan's interest is in the development of finite element models of hip and knee joints as well as models of both lumbar and cervical spines. His current modeling activity includes development of models of the lumbar spine with varying degrees of degenerative disease and understanding how adjacent disc disease progresses in patients.

Dr. Vincent Wang uses biomechanical, imaging and extracellular matrix biologic approaches in animal models to study mechanisms of tendinopathy. Particular emphasis is placed on the roles of ADAMTS enzymes in aberrant matrix remodeling as well as the potential therapeutic benefit of mechanical loading in promoting tendon healing.

Dr. Markus Wimmer investigates the effects of load and motion in human joints. Using both gait analysis and in vitro simulation, he studies wear and lubrication of natural and artificial joints. He is working on a better understanding of the degradation mechanisms in vivo, and trying to enhance preclinical wear testing methods.

Biotechnology: Program Overview

The Graduate College offers a nine-month, non-thesis academic and laboratory master's-level training program designed to prepare the student for a research career in the pharmaceutical and biotechnology industries or the university laboratory. This program is also an excellent preparation for further training in graduate school or professional programs.

The student will take the Graduate College's curriculum series of didactic courses covering principles of molecular genetics, cellular biochemistry, cell biology, tissue biology and system physiology and pharmacology. Additional courses designed specifically to prepare students for a career in the laboratory and

research, including Experimental Design and Models in Disease, Tools for Research, Biostatistics, Research Ethics, Scientific Writing, Communication and Management, are also required. Finally, students will participate in hands-on laboratory courses designed to cover the common and most important techniques and methods employed in research today. These laboratory experiences will ensure proficiency in a wide variety of techniques, making the student highly competitive for employment in this ever-expanding and understaffed job market. This program also gives an excellent expansion in basic sciences and its applications, thus serving well those students who wish to further their studies in professional schools or join a PhD program.

Biotechnology: Curriculum

Fall Semester		SH
BTN-523	Tools for Research	1
BTN-525	Experimental Design and Models of Disease	2
BTN-531	Laboratory Techniques I (introduction to laboratory; good laboratory practices, data management)	2
BTN-532	Laboratory Techniques II (tissue culture; cell sorting)	2
GCC-501	Molecular Biology and Human Genetics	2
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	2
GCC-520	Introduction to Pharmacology/Physiology I	3
		14
Spring Semester		
BTN-524	Communications	1
BTN-526	Laboratory Management	1
BTN-533	Laboratory Techniques III (electrophoresis; genomics; transfection; PCR)	2
BTN-534	Laboratory Techniques IV (study design; animal handling; surgical techniques)	2
BTN-535	Laboratory Techniques V (advanced quantitative techniques and independent research)	2
BTN-536	Laboratory Techniques VI (histology and immunohistochemistry; microscopy)	2
GCC-503	Functional Cell Biology	1
GCC-504	Functional Tissue Biology	2
GCC-506	Research Ethics	1
GCC-507	Biomedical Statistics	2
GCC-508	Scientific Writing	2
GCC-521	Introduction to Physiology and Pharmacology II	3
		21
Semester Hours Required for MS Degree:		34

Biotechnology: Admission Requirements

Admissions to the biotechnology program are offered for the fall semester only. The Graduate College feels that a qualified and dedicated student can complete the requirements of the full-time curriculum within the two-semester academic plan. It must be emphasized that this is a rigorous program that will require full attention and commitment by the student.

The faculty of the Graduate College encourages diversity among the student population and therefore seeks to admit persons from various backgrounds. The Graduate College uses the following guidelines to evaluate candidates for admission:

1. **Deadline for applications:** All F-1 visa holders are encouraged to apply by March 15. For U.S. students, applications are received until the class is filled; however, applications must be completed with all supporting documents received by June 30.
2. **Application requirements:**
 - a. All students must complete an application to the Graduate College online.
 - b. A minimum of three letters of recommendation are required, and a minimum of two should come from academic sources.
 - c. An interview may be required.
 - d. Students must have scores submitted for the GRE or an equivalent test (e.g., MCAT, DAT, PCAT or other equivalent exam in the sciences). Although no specific score on these exams is required, students scoring above the 50th percentile are strongly encouraged to apply. GRE is waived for applicants with a PhD degree in basic science or a professional degree in health sciences (e.g., MD, DO, DDS, PharmD).
 - e. Students with a GPA of 3.0 or better on a 4.0-point scale are encouraged to apply.
 - f. Please submit an official transcript from each college or university attended. All transcripts must be received in an original sealed envelope from the institution. Scanned items can be used for review and preliminary admission decisions; however, official documents will be required for final admission decision. Formal course by course grade/diploma certification by ECE is required of all students who have completed their last degree outside of the U.S.
 - g. Applicants whose native language is other than English and who do not hold an equivalent of a U.S. bachelor's degree from an institution in a country where English is the official language must submit scores from TOEFL.
3. **Acceptance letters:** Official acceptances for students will come only from the Dean's office. No students will be accepted after August 1 unless they were officially placed on a wait list.

Specific admission requirements may be waived by the Graduate College Council. These will be addressed on a case-by-case basis.

Applicants who consider themselves to have special or unique qualities that make them strong candidates for graduate education are also encouraged to apply. Research and related job experience are valued highly in the admissions process and will be taken into account. Interviews with applicants are extremely helpful and can play a significant part in the admission decision. Beyond these measures, the faculty attempts to determine the applicant's motivation and potential for advanced study and a research career in the sciences. Once the Office of College Admissions Services has received all required documents, including the application fee, the applicant's admission materials are reviewed by the program director and approved by the Dean. In special circumstances, the application file is sent to the Graduate College Council, where a review of the application takes place. The Office of College Admissions Services then notifies the applicant of the decision. Additional information and the admission application are available at <http://www.rushu.rush.edu/gradcol>.

Biotechnology: Academic Policies

Academic Standing

All students who maintain a cumulative grade point average of 3.0 while completing the required course sequence with full-time enrollment will be considered to be in good academic standing within the Graduate College and are eligible for graduation with the MS degree.

Any student who fails to maintain a 3.0 grade point average will be considered to be in academic difficulty until the deficiency is corrected. Those requirements will be determined by the biotechnology program director with the advice of the Dean and Graduate College Council. A student in academic difficulty is not eligible for graduation.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Biotechnology: Graduation Requirements

The successful completion of the biotechnology curriculum with a minimum 3.0 (on a 4.0 scale) cumulative GPA will qualify the student for graduation. No thesis or other activity is required. The Master of Science degree is conferred to biotechnology students.

Clinical Research: Philosophy

The Master of Science program is designed to train health care professionals to undertake and evaluate clinical research. This program is part of the Graduate College. The two-year, thesis-requiring program involves one year of didactic lectures scheduled in late afternoon followed by a one-year, mentored clinical research experience. Both years are designed to provide the necessary skills needed to perform clinical research in the 21st century. The coursework covers experimental design and historically important clinical trials, as well as clinical research with a faculty mentor. Skills and techniques needed for epidemiology, outcomes and clinical pharmacology research are also provided. The emphasis of the program is to make available the skills needed for successful undertaking and completion of an independent clinical research project.

Clinical Research: Admission Requirements

This program is targeted to health care professionals with advanced degrees including MD, PhD or PharmD degrees. Students with other advanced degrees including nursing and pharmacy degrees and experience in clinical trials may also apply; however, an advanced degree is not required. Many students in the program are physicians in fellowship programs at Rush University Medical Center and the John H. Stroger, Jr. Hospital of Cook County. Students seeking admission to the Master of Science in Clinical Research program must complete an application and provide formal transcripts from all institutions of higher education that were previously attended. The deadline for application is generally June 30, although exceptions can be made. Applicants must enter the program in the fall semester, which starts in early September. The majority of students applying to this program are current health professionals, and if an advanced health professional degree is documented, no entrance examination is required. If the applicant does not hold a professional degree, the GRE must be taken. If evidence of performance in the 50th percentile in national examinations (e.g., MCAT or DAT) is provided, the GRE requirements can be waived.

Applications will be reviewed by the program director, and students will be notified when they are accepted.

Clinical Research: Curriculum

The curriculum for the program is single track the first year and self-directed the second year. All students in the program are required to maintain a cumulative average of "B" or greater (or pass). Courses offered are graded in year one as either pass/no pass or with a letter grade. With the exception of the IRB modules, all classes in the first year are scheduled on Tuesdays and Thursdays from 3:30 to 6:30 p.m.

Year 1		
Fall Semester I		
CRE-557	Clinical Trials I (intro to clinical research)	2
CRE-558	Clinical Trials II	2
GCC-551	Ethics in Biomedical Research and the IRB	2
PHR-556	Tools for Research	1
GCC-546	Principles of Biostatistics I	2
GCC-548	Bioinformatics	1
CRE-597*	Thesis Research	variable
Spring Semester I		
GCC-552	Introduction to the Regulatory Process: Drug Discovery and Development	2
GCC-547	Principles of Biostatistics II	2
GCC-549	Bioinformatics II	1
PVM-553	Observational Epidemiology	1
CRE-597*	Thesis Research	variable
GCC-548	Bioinformatics	1
PHR-556	Tools for Research	1
Summer Semester I		
CRE-597	Thesis Research	variable
Year 2		
Fall Semester II		
GCC-593	Grantsmanship	1
CRE-597	Thesis Research	variable
CRE-559	Readings in Special Populations	1
CRE-523	Readings in Clinical Research	1
Spring Semester II		
CRE-597	Thesis Research	variable
CRE-559	Readings in Special Populations	1
CRE-523	Readings in Clinical Research	1
Minimum of credits to graduate:		32

*International Students must consult Program Director prior to registration.
Note for CRE-597 Thesis Research, credits can be taken in varying hours from 0-9.

Students are required to take the readings courses in the second year, although students may also take other electives in topics dealing with Clinical Trials, Outcomes/Epidemiology Research or Clinical Pharmacology. Classes are tailored to the specific needs of the student and are arranged through the program director. The students will also meet periodically with the program director during the second year to monitor progress on their master's thesis research project.

A student who fails a class or receives a no-pass in a course will have an opportunity to retake the exam or rewrite the paper to reverse the no-pass grade. A cumulative average of "B" or greater (pass) in required courses is needed to continue in the program. Failure to remediate the no-pass grade will automatically require the program director to review the student's status and officially place the student on academic probation for a period of one semester. The course director will develop a remediation plan to ensure the student has mastery of the subject area covered. Required courses are GCC 551, 552, 546, 553; CRE 557, 558; and PHR 556.

The second year is designed to provide an intense mentored clinical research project under a mentor's guidance and the preparation of a master's thesis. Students usually enroll in at least six credit hours per semester. These are typically research hours (CRE-597) or elective readings classes. The student and mentor will identify a clinical research project and will submit that project in the form of an abstract by the end of the spring semester of year 1. The student and mentor will further refine the proposal in the summer between the first and second year. Only clinical projects will be considered for this program. The student is expected to complete all of the data collection by the beginning of the spring semester for submission of the thesis by the end of the spring semester of the second year.

Minimum Credit Hours Required

Successful completion of the clinical research program requires 32 semester hours as a minimum for graduation along with preparation and public defense of a written thesis. Students may opt to take additional hours and can enroll in mentoring internships for up to 9 credit hours per semester. This option places the student in a clinical or laboratory environment 10 hours per week, performing research with a clinical research scientist, enabling a 9-credit hour per semester experience.

Clinical Research: Thesis Process

After identifying a mentor, the student and mentor will begin to outline the research project during the spring and summer of the first year. This can be of the student's own design or, alternatively, a student may participate in a large multicentered trial provided permission is received in advance for publication of the subset of that data collected by the student as a thesis. Any project that involves patient-oriented research (requires IRB approval, or involves a systematic review of patient data) can be submitted. By midterm of the spring semester the student can submit the project in the form of a scientific abstract with anticipated methods, statistical analyses, power analysis and outcomes, or present an oral abstract. The program director must approve the abstract. Once approved, an IRB application can be submitted.

The student will be encouraged to write a first-author manuscript summarizing his or her work and submit that manuscript for review. This manuscript can then be modified to meet the University standards for thesis submission and serve as the thesis. If a manuscript is not written and submitted, the student must still present a written thesis for consideration for degree completion. All students will present their work publicly in May prior to graduation. The mentor and program director sign the completed thesis document suggesting that a majority of the committee has accepted the thesis. There are no written or oral qualifying exams for the program.

Clinical Research: Academic Policies

For a student to remain in good standing, the Graduate College requires that the student have a passing ("B" or higher) cumulative average for all required coursework. For this purpose a "P" will count as a "B" for grade averaging.

Students are expected to attend all classes and participate in discussion. Students are also expected to participate in the various computer laboratories that are routinely held in the McCormick Educational Technology Center (METC) throughout the first year of the program.

Students are expected to conduct themselves in a professional manner. This includes respecting the rights of others and being kind and courteous to students, faculty/staff and patients. Intimidation of other students and faculty/staff will not be tolerated and is grounds for dismissal. Sexual harassment as well as harassment related to race, color, religion, sexual orientation, national origin, ancestry, age, marital or parental

status, or disability is prohibited. The University Bulletin details the policies regarding inclusion of minorities and those with disabilities as well as the policies and procedures for reporting harassment. The Graduate College understands that many of the students are clinicians, but it does expect for them to be on call during class time (generally 3:30 to 6:30 p.m. on Tuesdays and Thursdays).

The Master of Science in Clinical Research program follows the University Policies on Academic Honesty and the University Statement on Student Conduct.

Student Grievance Procedure

Numerous checks are in place to assure the fair treatment of students. However, if a grievance does evolve, the student should speak with the program director first in an attempt to resolve the problem. If this is unsuccessful or the grievance involves the program director, the student's grievance can be appealed to the Dean of the college.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Clinical Research: Graduation Requirements

The student must maintain a passing cumulative average of B or higher to graduate. The student's advisor and the program director must approve the student's thesis.

Clinical Research: Faculty Research Interests

Because this is a multidisciplinary program, there are no identified faculty members aside from those who teach in the curriculum. Please see the various clinical departments/sections for their respective research interests.

PhD in Health Sciences: Curriculum

The curriculum for the PhD in Health Sciences has been designed to offer a rigorous and comprehensive program of study in health sciences. It is aligned on three core competencies of Education, Research and Statistics, and Leadership and ten professional tracks including Medical Laboratory Science, Speech-Language Pathology, Audiology, Health Systems Management, Medical Physics, Clinical Nutrition, Occupational Therapy, Perfusion Technology, Physician Assistant Studies and Respiratory Care.

Student Learning Outcomes

Prior to graduation, all students in the program will demonstrate achievement of the competencies described below in each of the core competency areas of education, research, and leadership. Students will also demonstrate achievement of the required competencies in their individual professional track cognate areas.

Education Core (12 QH)

Upon completion of the program, the student will be able to:

1. Demonstrate enhanced critical thinking and analytical skills related to educational program design, development, implementation, administration and evaluation.
2. Exhibit the capacity for educational leadership within the setting of higher education.
3. Understand learning theory as applied to professional and adult education.
4. Apply learning theory to development and application of teaching methods and specific learning platforms.
5. Integrate learning theory and methods into the curriculum to include program and course design, delivery, administration and evaluation.
6. Integrate the historical, philosophical, social and cultural foundations of curriculum as a field of study with the development and administration of allied health professional training programs.
7. Perform a needs analysis for health science course and program development.
8. Design and implement competency-based health science program curricula.
9. Develop course descriptions, course outlines, syllabi, goals, objectives, content, learning activities and evaluation methods for specific programs and learning audiences.

10. Evaluate health science program curricula using both process and outcomes assessment.
11. Develop and implement specific teaching and learning methods for course content delivery in the classroom, teaching laboratory and clinical or practicum settings.
12. Select and apply appropriate learning platforms for course and program delivery to include traditional lecture-discussion, small group work, projects, and the use of educational technology and web-based instruction.
13. Develop criterion-related testing for courses and programs to include the use of both objective and subjective testing methods and evaluation of the cognitive, psychomotor and affective domains.
14. Develop and apply program evaluation to include measurement tools and program revision based on evaluation results.
15. Develop assessment-driven, standards-based instruction for education and training.
16. Work as scholar-practitioners by applying current educational research and theory to lead the development of the health science/allied health professions.
17. Demonstrate effective teaching and evaluation methods that assure that learning occurs through:
 - a. The development and/or improvement of course syllabi that facilitate assurance of learning.
 - b. Preparation of effective lectures, discussions and presentations using the appropriate venue to support learning.
 - c. Delivery of course topics under the guidance of faculty mentors.
 - d. Evaluation of learning outcomes and feedback to students.
 - e. Maintenance of a teaching portfolio.

HSC-601: Education Theories and Methods maps to Education Core outcomes 1, 2, 3, 4, 15 and 16.

HSC-602: Curriculum and Instruction maps to Education Core outcomes 1, 2, 5, 6, 7, 8, 9, 10, 15 and 16.

HSC-603: Methods and Evaluation maps to Education Core outcomes 1, 2, 11, 12, 13, 14, 15 and 16.

HSC-604: Teaching Practicum maps to Education Core outcomes 1, 2, 4, 5, 8, 9, 11, 12, 13, and 17.

Research and Statistics (21 QH)

The overall aim of the research core is to enhance the student's knowledge of scientific methods to include how to define the scientific problem, the rationale behind the review of literature,

selection of the research design, data analysis, results and discussions. These courses will deepen the student's knowledge and understanding of quantitative and qualitative research methods with a focus on interdisciplinary, collaborative and outcomes research in the health sciences.

Upon completion of the program, the student will be able to:

1. Demonstrate a thorough understanding of research design and methods.
2. Understand and have the ability to interpret and apply basic and advanced research statistical models.
3. Effectively evaluate and critique research reports.
4. Identify knowledge gaps for selected allied health fields, synthesize relevant information, and formulate focused research questions to address these gaps.
5. Identify specific problem areas for research and conduct a thorough review of the literature.
6. Develop and refine specific aims, research questions, and hypotheses based on the review of the literature.
7. Select and apply appropriate research methodology to address specific research questions.
8. Develop appropriate research protocols.
9. Obtain institutional review board approval for conducting research studies.
10. Initiate approved research protocols and collect data.
11. Apply appropriate statistical analyses to data collected and interpret the results.
12. Write research reports and present and publish research findings.
13. Engage in collaborative, interdisciplinary research, with a focus on outcomes and evidence-based practice.
14. Conduct research as scholar-practitioners to lead the evolution of practice in professional settings.
15. Seek funding for a collaborative, interdisciplinary research agenda.
16. Address issues in research management including:
 - a. Formation and leadership of multidisciplinary teams.
 - b. Staffing, budgeting and tracking.
 - c. Subject recruitment and retention.
 - d. Data quality control and data safety management.
 - e. Funding mechanisms and grantsmanship.
 - f. Research ethics and regulations.
 - g. Professional quality peer-review, oral and poster presentation, report, grant, and manuscript writing.

17. Conduct investigations that support evidence-based problem solving of direct relevance to the student's work and career development.

18. Identify appropriate funding agencies and opportunities.

19. Develop and submit proposals to obtain grant funding.

HSC-610: Research Design 1 and HSC-611: Research Design II map to Research outcomes 1, 3, 7, 8, 13, and 14.

HSC-612: Statistics I and HSC-613: Statistics II map to Research outcomes 2, 3, 7, 8, and 11.

HSC-614: Introduction to Grantsmanship maps to Research outcomes 15, 16, 18, and 19.

HSC-615: Research Seminar 1 and HSC-616: Research Seminar 2 map to Research Outcomes 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17.

Leadership Core (10 QH)

Upon completion of the program, the student will be able to:

1. Describe evidence-based methods for developing and evaluating leadership.
2. Demonstrate leadership development in an interdisciplinary health care environment.
3. Achieve interdisciplinary goals in practice, education, scholarship and service.
4. Practice in an interdisciplinary manner to model collaborative care.
5. Engage in reflective practice for continuous professional growth and improvement.
6. Demonstrate professional and ethical leadership.
7. Demonstrate the capacity for educational leadership within the setting of higher education.
8. Describe current issues and trends in health care and apply these to professional practice and research. Examples include:
 - a. Health care reform
 - b. Health care costs, access and quality
 - c. Interdisciplinary and collaborative health care and health care research
 - d. Evidence-based practice and comparative-effectiveness research
 - e. Health care disparities
 - f. Health care finance
 - g. Workforce issues
 - h. Health promotion and disease prevention

- i. Management of chronic disease
- j. Implications of targeted therapy and genetic testing
- k. Issues in higher education

9. Conduct informed thinking and planning for organizational strategies with appropriate data.

10. Apply standards of ethical leadership and management.

11. Work as scholar-practitioners by applying current research and theory to lead the development of the health science/allied health professions.

12. Describe the principles of management as they apply to health care organizations and institutions to include planning, organizing, controlling, and directing an operational unit.

13. Apply motivational theory and conflict management to interpersonal relationships within an organization.

14. Apply principles of management and supervision to the administration of college and university academic programs and departments.

15. Demonstrate an understanding of the governance, organization, finance, and administration of institutions of higher learning.

16. Understand the attributes and skills necessary to lead and manage professional organizations as complex and adaptive systems.

17. Engage in critical thinking, analysis, and problem solving that reflects scholarly intellectual standards, incorporation of sound reasoning, and equity and fairness.

HSC-620 Leadership Theory maps to Leadership outcomes 1, 2, 3, 4, 5, 6, and 7.

HSC-621: Issues and Trends in Health Care maps to Leadership outcomes 1, 2, 3, 4, 5, 6, and 8.

HSC-622: Ethics in Clinical and Research Settings maps to Leadership outcomes 5, 6, 9, 10 and 17.

HSC-623: Management and Supervision in Higher Education maps to Leadership outcomes 9, 10, 11, 12, 13, 14, 15, and 16.

Professional Track (16 QH)

Professional track cognate courses in the various professional areas in which students hold certification or licensure are provided with associated learning outcomes as follows. Upon completion of the program, the student will demonstrate:

1. An increased knowledge base in the professional specialty area.
2. Synthesis of an interdisciplinary perspective related to everyday activities and application of these perspectives as well as knowledge generated in health science to promote evidence-based practice.
3. Presentation of research related to the professional track at state and national meetings.
4. Teaching allied health-health science students in undergraduate and/or graduate programs.
5. Initiation and participation in communities of practice and other collaborations with professionals and community members to mobilize resources to best meet learner needs and enhance professional growth.
6. Development of expertise in ways that cross conventional disciplinary lines.
7. Identification of professional venues including conferences and journals for publication and dissemination of results.
8. Presentation of research findings to peers during organized extracurricular research seminars.
9. Preparation of research manuscripts suitable for submission for publication.
10. Maintenance of a research portfolio.
11. Use of evidence-based practice as part of daily clinical decision making.

Education Core Courses		Credit Hours
HSC-601	Education Theories and Methods	3
HSC-602	Curriculum and Instruction	3
HSC-603	Methods and Evaluation	3
HSC-604	Teaching Practicum	3
Research Core Courses		
HSC-610	Research Design I	4
HSC-611	Research Design II	4
HSC-612	Statistics I	4
HSC-613	Statistics II	4
HSC-614	Grantsmanship	3
HSC-615	Research Seminar I	1
HSC-616	Research Seminar II	1
Leadership Core Courses		
HSC-620	Leadership Theory	3
HSC-621	Issues in Health Care	3
HSC-622	Ethics in Clinical and Research Settings	1
HSC-623	Management and Supervision	3
Professional Tracks*		
See Professional Sections for Listings		16
Elective Courses**		
Electives		19
Independent Study (variable credit)***		
Independent Study		variable
Dissertation****		
HSC-617	Dissertation Research	12
MS Graduate Transfer Credit		
Graduate course credit Transfer		30-45

* Variable: Minimum 16QH

** Elective courses may be taken at Rush or other appropriate institutions

*** Variable credit with advisor approval

**** Variable: Minimum 12QH

Immunology/Microbiology

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Immunology/Microbiology: Philosophy

The Division of Immunology/Microbiology is committed to educating bright, creative individuals for careers in scientific investigation. The training is accomplished through faculty-led instruction in the classroom, independent self-study, laboratory rotations and intensive dissertation research under the direction of a mentor and student dissertation advisory committee. It is expected that students completing the PhD program will be skilled in the scientific method, will be capable of independent critical thinking, will be skilled as life-long learners and, with additional postdoctoral training, will become leaders in their chosen field. The division also offers a more limited educational program leading to the MS degree.

Immunology/Microbiology: Admission Requirements

Students who have received a baccalaureate degree in biological sciences or a related field may apply for the master's or the doctoral program. Candidates usually enter the program in the fall semester. Applications should be submitted by February 15 and no later than June 30. Applications will be evaluated by the Departmental Admissions Committee as they are received. It is possible that applications will be closed before June 30 if the class is filled before that date. Considerations for admission will include overall academic record, the recommendations of the sponsors, results of a recent Graduate Record Examination (GRE) and the description of the applicant's own aspirations and interests. International students are also required to submit a recent result of a TOEFL test. Admission criteria to the program are consistent with the general requirements of the Graduate College. A grade point average of at least 3.0 on a 4.0 scale as well as competitive GRE and TOEFL scores are required. Minimum GRE or TOEFL scores are not assigned. In rare circumstances, students that do not fulfill these requirements may be accepted at the discretion of the division and the Graduate College Council. Personal interviews will be arranged for potential candidates after the preliminary review. Students will be admitted into the program at levels other than first year only under exceptional circumstances; this will require approval

by the division director. Students may be accepted directly into a particular laboratory and will have that faculty member serve as their PhD academic/dissertation advisor, or they may be accepted at-large and will have the graduate program director initially serve as faculty advisor. The latter students will be required to fulfill a minimum of two laboratory rotations before selecting a dissertation research advisor. All student-advisor assignments must be approved by the department chairperson.

Immunology/Microbiology: Curriculum

Note that the program retains the right to change these requirements in order to keep current with research and education advancements.

First Year to Completion of the Program

During the first year after matriculation, students will enroll in the Graduate College Core Curriculum classes and other courses required by this division. The schedule for these classes is:

Year 1		
Fall Semester I		
GCC-501	Molecular Biology: Genome to Proteome	2
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	2
GCC-511	Readings in Molecular Biology	1
GCC-512	Readings in Cellular Biochemistry	1
IMM-507	Basic Immunology I	1
IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-515	Research Seminar	1
IMM-600	Laboratory Rotations	1
Spring Semester		
GCC-503	Functional Cell Biology	1
GCC-504	Functional Tissue Biology	2
GCC-506	Biomedical Ethics	1
GCC-513	Readings in Functional Cell Biology	1
GCC-514	Readings in Functional Tissue Biology	1
IMM-508	Basic Immunology II	1
IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-515	Research Seminar	1
IMM-600	Laboratory Rotations	1
Summer Semester		
IMM-615	Pre-Dissertation Research (A pre-candidacy examination for doctoral candidates—described below)	12

Students in the PhD track must complete the requirement for a pre-candidacy examination (PCE) by the end of the summer semester. The PCE consists of both a written and oral portion. The written portion is based on a research proposal submitted to an examination committee appointed by the Graduate Advisory Committee (GAC). The topic of research must be preapproved by the GAC and must be different from the proposed research for PhD dissertation. The proposal should be based on the NIH R21 grant application format and should be no more than 7 pages in length (single-spaced) excluding bibliography. The oral portion of the PCE will consist of a presentation and defense of the grant proposal and may also include basic questions in their area of interest (immunology/microbiology). Students who fail the PCE will be asked to take a comprehensive written examination in immunology and microbiology. Failing this comprehensive written examination will result in recommendation for dismissal by the GAC to the Dean of the Graduate College.

Students are also expected to devote substantial time to research during the summer semester. After all core courses are completed, a student will be evaluated by the GAC for his or her performance in courses, laboratory work, motivation, etc., to determine continuation of the student in the program. This evaluation will take place before the beginning of the fall semester of the second year.

Second Year to Completion of the Program

The classes required during the second year are:

Year 2		
Fall Semester I		
IMM-510	Advanced Immunology	4
IMM-515	Research Seminar	1
IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-615	Pre-Dissertation Research	6
Spring Semester		
IMM-610	Special Topics (total of two required)	2
IMM-515	Research Seminar	1
IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-615	Pre-Dissertation Research	6
Summer Semester		
IMM-615	Pre-Dissertation Research PhD students should defend a dissertation proposal to move to candidacy.	12

Before the start of the fall semester, the student will select a laboratory and advisor for the dissertation research. The student and advisor will submit a list of faculty for the Student Dissertation Advisory Committee (SDAC) for approval by the GAC. The members of the SDAC will be allowed to change with GAC approval if the project changes substantially or if the faculty is no longer appointed at Rush. The composition of the SDAC must be consistent with guidelines of the Graduate College Council. At this time, the SDAC must consist of at least five members:

- The advisor
- Two faculty members from the Division of Immunology/ Microbiology. This may include a co-advisor.
- One faculty member from another division in the Graduate College
- An additional faculty member from within or from outside of Rush University

The student will prepare a dissertation proposal describing his or her plan for dissertation research and submit the proposal to his or her SDAC during the spring or summer semester of the second year. The SDAC must approve both the written document and oral defense of the document before the end of the summer semester. Preliminary data should be included, if available, but are not necessary and the presentation/defense should not be deferred to collect such data. While it is mandatory that students complete this requirement by the end of the summer semester, students are strongly urged to complete this requirement before this deadline so that they may begin their doctoral dissertation research in earnest as soon as possible. After successful defense of the research proposal and the dissertation proposal, the student will be admitted to candidacy. If the proposal defense is failed, the SDAC may require that the proposal be rewritten and defended prior to the end of the fall semester of the third year. A failure at the second defense will result in a recommendation for dismissal from the program.

Three to Five Years to Completion of the Program

Students should continue to register for Special Topic (IMM-610) courses from years 2 through 4 until they have completed two special topic courses prior to graduation. In special circumstances, students may substitute special topic courses with an elective, contingent upon permission of the graduate program director. Doctoral students are expected to register for IMM-520: Advanced Readings in Immunology and Microbiology, IMM-515: Research Seminar and IMM-620: Dissertation Research each fall and spring semester. Examples of previous special topics courses include Current Topics in Cellular Immunology — From Bedside

to Bench; HIV Gene Structure and Function; Viral Mimicry; Toll-like Receptors; Signal Transduction in Lymphocytes; Vaccines; and Th2, Parasites, and Allergy. Students must also devote maximum time to research during these years.

When the student and the advisor have determined that sufficient data have been obtained and that the project has reached an acceptable degree of completion, a data defense meeting with the SDAC is held in which the student summarizes the data that will be included in the dissertation. If the SDAC approves, the student will commence writing the dissertation. A requirement for graduation is an accepted first-author publication in a peer-reviewed journal based on the student's dissertation research.

Curriculum for Students in the Master's Track

Students in the master's track are required to take the same first year of classes as the doctoral students. After the completion of first year, students in the master's track are required to submit a topic of research for approval by the GAC by the summer semester of the first year. After approval, the student is expected to pursue full-time research in this area, while continuing to register for Research Seminar and Advanced Readings in Immunology and Microbiology. Students need to form a research committee made up of their advisor and two faculty members within the Graduate College. They are expected to summarize their findings in the format of a manuscript and defend it orally to their committee members in an open defense. It is expected that the MS degree will be completed within two years of matriculation.

Immunology/Microbiology: Academic Policies

Five-Year-Rule Limit after Matriculation

The Division of Immunology/Microbiology honors the five-year-rule limit after matriculation stated by the Graduate College. The rule states that "Maximum enrollment for degree completion is five calendar years. Any approved leave of absence will be excluded from this time. A student may petition for an extension of the overall time limit to the division director. If such an extension is granted, the student will be expected to enroll full-time for each remaining semester in residence. If a student proposes to maintain active status in the Graduate College while at another location, approval by the division director and the Graduate College Council will be necessary. Such a student will enroll each semester with Rush University's Office of the Registrar for zero hours of credit, and will be charged the enrollment fee rate in effect at that time."

Vacation

Students are entitled a total of two weeks of vacation per year. The advisor must approve the vacation timing.

Parental Leave Policy

Parental leave will first be negotiated between student and advisor, subject to the provision that students may take up to six weeks (total) off during pregnancy and/or following the birth of a baby, with full stipend. If a student elects to take a longer period before returning to full-time graduate status, this additional time will be automatically considered a leave of absence with no stipend provided. A student on paternity/maternity leave of absence is guaranteed reinstatement for up to six months after delivery.

Conditions for Continuation in the Program

If a student leaves residency in the program without completing the requirements of his or her degree, he or she may continue his or her status as a student for an additional two years, provided he or she arranges to meet the SDAC every six months. Otherwise, the student will be subject to dismissal at the end of six months after leaving the program.

Ethics

All students are expected to keep a good and careful record of their research. Any student found falsifying, plagiarizing or misrepresenting data will be dismissed from the program. The original of all records must remain in the laboratory in which the student worked.

Problems Between Advisor and Student

Prior to forming the SDAC, if a problem arises between student and advisor, this problem should be discussed with the Division Director, who will then attempt to mediate and provide a reasonable solution to the problem. If a problem arises between a student and the advisor after the student has formed the SDAC, the student and/or the advisor should discuss the problem with the SDAC chair. If the problem is not resolved within one month, the student/advisor should discuss it with the Division Director. It is recommended that difficulties be solved at an early stage. If the informal approaches are unsuccessful, and a student and/or advisor desires to sever their working relationship, those individuals involved shall petition in writing for such change to the program director. From the date of receipt of the written request for a change, two weeks of mutual introspection time is required before any change is considered. The Division Director will make the decision whether or not to honor the student's request for transfer and will make the necessary arrangements to make the

transition smoothly. An advisor change is a serious matter and should only be contemplated after all other avenues have failed. Students must also be aware that an advisor change is not automatically approved, and that the availability of an alternate advisor may be very restricted.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Immunology/Microbiology: Tuition Waivers and Assistantships

Eligibility

As a part of the program's intention to provide the opportunity to advance academically and develop scholarship in a reasonable period of time, students in the PhD program receive a tuition waiver and a student assistantship to allow vigorous and full-time commitment to their academic endeavors. Students in the MS program do not receive a tuition scholarship or an assistantship.

Assistantships for students in the PhD program may be withheld or reduced for those students that fail to provide a full commitment to research and scholarly activities after passing the pre-candidacy examination. This reduction will be submitted to the Graduate Advisory Council (GAC) via a recommendation by the student's advisor. The GAC may then inquire into this issue and decide on an outcome. Students in good academic/research standing are assured of their assistantship for five years by their sponsoring department or section. Assistantship support beyond five years is at the discretion of the advisor. Students are accepted into the program with the understanding that they will devote their full time to learning and research. Students in the PhD degree track receiving an assistantship and tuition waiver who, for reasons other than departmental and college decisions, transfer to the MS degree track may be required, at the discretion of the GAC, to repay the cost of tuition and assistantship support provided to them.

Immunology/Microbiology: Research Activities

Faculty members are based in an active medical center dedicated to patient care; to the support of clinical, biomedical and basic biological research; and to education in allergy, basic and

clinical immunology, and microbiology. The following is a list of current active faculty and their primary research interests, as well as faculty in the Allergy and Immunology clinical program of the department.

Lena Al-Harhi, PhD, George Washington University (Professor and Associate Chair): HIV neuro- and immuno-pathogenesis; Role of Wnt/b-catenin signaling in HIV disease

Edward Barker, PhD, University of Illinois at Chicago (Associate Professor): Mechanisms of HIV immune evasion; Natural killer cells

Linda Baum, PhD, Michigan State University (Professor): Antibody-dependent cellular cytotoxicity in HIV disease

James W. Bremer, PhD, Baylor University (Professor): Clinical virology; Pathogenesis of HIV infection

Christopher Codispoti, MD, PhD, University of Cincinnati (Assistant Professor): Impact of environmental factors on allergic disease

Seema N. Desai, PhD, University of Mumbai (Assistant Professor): Immune activation and senescence in HIV disease

Vineet Gupta, PhD, University of Rochester (Associate Professor): Drug discovery; Integrins and inflammation; Podocyte biology

Nadim James Hallab, PhD, Rush University Medical Center (Associate Professor): Innate and adaptive immune responses to orthopedic implant debris; Implant preservation; Drug testing

Diana D. Huang, PhD, University of Michigan (Assistant Professor): HIV virology; Diagnostic tests for HIV infection

Alan L. Landay, PhD, University of Pittsburgh (Professor and Chair): Immune response to HIV infection; Clinical markers of HIV infection

Nell Lurain, PhD, Loyola University of Chicago (Associate Professor): Cytomegalovirus drug resistance and pathogenesis

Amanda Marzo, PhD, University of Western Australia (Assistant Professor): Mechanisms that govern the induction and maintenance of memory T cells

James N. Moy, MD, University of Illinois at Chicago (Associate Professor): Regulation of atopic disease

Sasha Shafikhani, PhD, University of California, Berkeley (Assistant Professor): *Pseudomonas aeruginosa* pathogenesis; Host response to infection

David L. Williams, PhD, University of Illinois Urbana-Champaign (Associate Professor and Graduate Program Director): Biochemistry and molecular biology of *Schistosoma mansoni*; Drug development

Immunology/Microbiology: Service/Clinical Activities

In addition to offering the graduate program and conducting active research programs, the department teaches immunology and microbiology to medical students, offers an allergy/immunology residency program and maintains a close affiliation with the hospital's clinical immunology and microbiology laboratory.

Radiological Sciences & Medical Physics

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Radiological Sciences & Medical Physics: Philosophy

The Division of Medical Physics offers two programs of study and clinical research leading to graduate degrees: Master of Science with a major in radiological sciences or Doctor of Philosophy with medical physics as the area of interest. The faculty members of the division are active in theoretical and experimental research in medical physics and its clinical applications. The faculty's diverse interests allow the division to offer a program that can satisfy students' interests and needs in several areas of medical physics:

- Dosimetry
- Imaging applied to medicine
- Radiation sources
- Physics of radiation oncology
- Physics of diagnostic radiology
- Physics of nuclear medicine
- Radiation protection

The counterpart Department of Medical Physics in the College of Health Sciences offers a Medical Physics Residency Program. The primary purpose of this postdoctoral training program is to provide specialized research, instruction and clinical training in cancer radiation treatment-related areas of medical physics.

Note For the Current Academic Year

Admission of students to the PhD program in any given year is contingent on a number of factors, including availability of necessary resources, such as faculty, space and equipment, and the level of interest expressed in the applicant pool. The program's leadership has assessed these and other factors and has concluded that no new students will be admitted for the current academic year. Questions about the program and its future plans should be directed to the program director.

Medical Physics: Admission Requirements

Note for the Current Academic Year:

PhD Program: The Graduate College offers a PhD degree in Medical Physics that provides a curriculum to prepare researchers and practitioners. Admission of students to this program in any given year is contingent on a number of factors, including availability of necessary resources, such as faculty, space and equipment, and the level of interest expressed in the applicant pool. The program's leadership has assessed these and other factors and has concluded that no new students will be admitted for the current academic year. Questions about the program and its future plans should be directed to the program director.

MS Program: The Graduate College also offers an MS degree in Radiological Sciences. Applicants to this program should have received an MD or DO degree from an accredited institution and have been accepted to the medical residency program in Radiation Oncology or Diagnostic Radiology. The studies required for the MS degree may be carried out concurrently with the clinical residency program. Applicants should have obtained a letter of approval from the chair of the department in which the resident is being trained before submitting an application for admission.

Medical Physics: Academic Policies

Grievances

The department advisory committee, at the request of a student, will resolve a grievance between the student and faculty concerning:

- Course grade and preliminary examination results that may result in the student's dismissal
- Unreasonable delay in completing the dissertation research
- Failure to pass final oral defense of the dissertation

The student may appeal the decision of the department advisory committee to the Graduate College Council and to the Dean, according to the Graduate College policies and procedures.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Medical Physics: Curriculum

Master of Science, Major in Radiological Sciences Program

The studies required for the master's degree may be taken concurrently with the residency program, provided prior approval is given by the chair of the department in which the resident is being trained. Full-time students should complete the Master of Science degree in one calendar year. Part-time students will require more time. Each student will submit a thesis on his or her research and will take a final examination in defense of the thesis.

Medical Residents in Therapeutic Radiology

The following courses are required for medical residents in therapeutic radiology: MPH-521, 523, 525, 526, 900 and 580. The courses MPH-570, 608, 621, and 622 may be chosen as electives in the master's degree program.

Medical Residents in Diagnostic Radiology and Nuclear Medicine

The following courses are required for medical residents in diagnostic radiology and nuclear medicine: MPH-541, 561, 562, 565, 900 and 580. The courses MPH-608, 621, and 622 may be chosen as electives in the master's degree program. Other electives are available at Rush University.

Medical Physics Doctor of Philosophy Program

The PhD program is intended to be completed in four to five years of full-time study beyond the bachelor's degree. The minimum residency requirement established by the Graduate College is two years of full-time enrollment. During the first year, the student will be committed to completing required coursework and any deficiencies. During the second and later years, required courses will be completed, and the student will be encouraged to enroll in appropriate advanced courses within the Graduate College. Ordinarily, research begins near the end of the second year, and it will continue as the primary activity throughout the third and later years. The following courses are required:

- MPH-601, 602, 603, 621, 625, 900
- Core courses in the Graduate College

Students may choose other electives at Rush University.

Medical Physics: Academic Progression

Master of Science Students

Academic Progression

The graduate program director acts as academic advisor to each new student. The director determines the course schedule with students and monitors their progress. Soon after entry, students select the area of research they wish to consider for their master's theses. Each student seeks out a faculty member of the Division of Medical Physics who will become his or her scientific advisor. The advisor and student assemble an advisory committee of four members, at least two of whom are on the Graduate College faculty. The advisor serves as chair of the advisory committee. The committee is responsible for adapting continued coursework to the student's needs and for providing advice and evaluation at all stages of the graduate program. Specifically, the committee will evaluate the student's thesis proposal, thesis and performance at the thesis defense. Before beginning the specific thesis research, the student must present a detailed proposal, including a literature review, to the advisory committee. At that time, the student will be required to give an oral defense of the study that demonstrates his or her understanding of the study's goals and methods. When the committee is satisfied with the proposal, the student may begin the research project. Although the major advisor will closely supervise the research, it is the student's responsibility to attain the research goals.

Thesis Defense

The thesis is a scholarly work based on an original project. Its format and review by the advisory committee and Dean must comply with the requirements of the Graduate College. Oral defense of the thesis serves as the final examination in partial completion of the requirements for the master's degree. The examining committee includes a minimum of four faculty members approved by the department advisory committee. At least two examiners, including the student's principal and associate advisors, are selected from within the division. Two examiners may be selected from outside the division, preferably though not necessarily, from outside the University. Distinguished scientists may be invited as guests of the division to examine the thesis and to participate in the final defense. Passing the final examination is based upon the recommendation of the majority of the examiners. If the student fails to pass the final examination, the student may appeal to the Dean of the Graduate College.

Doctor of Philosophy Students

Academic Progression

The graduate program director functions as academic advisor to each new student during the first year. During this time, the director determines course schedules with students and monitors their progress. Toward the end of the first year, students take a qualifying examination covering basic physics, therapeutic and imaging physics, radiation protection, transfer function analysis and current topics discussed during the medical physics seminar series. This examination includes written and oral components. Based on the results of the qualifying examination and performance in coursework, students may be permitted to continue in the program without conditions. If a student's performance is poor, he or she may either be permitted to continue with added requirements or be dismissed from the University. During the second year, the student selects the area of research he or she wishes to consider for the PhD dissertation. The student should seek out a faculty member of the Division of Medical Physics who will act as the scientific advisor. The advisor and student assemble a dissertation committee of no fewer than five members, at least three of whom are on the Graduate College faculty. The department advisory committee must approve the membership of the dissertation committee. Toward the end of the second year, the student is expected to take a preliminary oral examination. This examination is given only after the student has completed all required courses and eliminated all deficiencies. At the oral examination, the student is required to:

- Demonstrate competency in general and clinical medical physics
- Demonstrate adequate knowledge in medical physics
- Defend the research proposal
- Show his or her understanding of the proposed study's goals and methods

The dissertation committee conducts the oral examination. The student's level of performance on this examination determines whether he or she is admitted to candidacy for the PhD degree. Students failing to gain admission to candidacy may be retested six to twelve months after the original examination date. The student may begin and register for dissertation research after admission to candidacy. The dissertation committee meets with the student periodically to review progress and provide feedback. The major advisor closely supervises the research, but it is the student's responsibility to attain the research goals.

Dissertation

The dissertation is a scholarly work based on an original project. Its format and review by the dissertation committee and Dean must comply with the requirements of the Graduate College. The public presentation and oral defense of the dissertation serve as the final examination in partial completion of the requirements for the PhD degree. Distinguished scientists outside of Rush may be invited as guests of the division to examine the dissertation and to participate in the final oral defense. The dissertation committee examiners recommend whether a student passes the final examination.

Medical Physics: Educational Activities

In addition to providing educational and research experiences for students in the graduate program, the medical physics faculty members, most of whom hold joint faculty appointments in Rush Medical College, teach medical students and other students and residents.

Medical Physics: Professional Certification

The Medical Physics program provides the basis for certification as a radiological physicist by the American Board of Radiology.

Medical Physics: Career Opportunities

Medical physics applies the concepts, methods and forces of physics to the diagnosis and treatment of human disease. Medical physicists work at the forefront of medical science, often in hospitals with or without associated academic programs. They provide clinical physics services, carry out research, give direct assistance to their medical colleagues and help train future medical physicists, resident physicians, medical students and medical technologists.

Medical Physics: Graduation Requirements

Master of Science, Major in Radiological Sciences

A minimum of 32 semester hours of courses, including research, is required for the Master of Science degree with a major in radiological sciences. Of these, a minimum of 14 hours of medical physics courses, excluding research, is required. A minor is not necessary in this program. Students must maintain a minimum GPA of 3.0. The maximum amount of medical physics credit acceptable for transfer from another institution is 12 semester hours. There is no foreign language requirement. The time limit for completing the program is five years.

Doctor of Philosophy

A minimum of 32 semester hours of medical physics courses (including research) must be completed successfully. A total of 72 semester hours of academic credit are required for the PhD degree. A maximum of 28 semester hours of transfer credit will be accepted. There is no foreign language requirement.

Medical Physics: Research Activities

- Study of basic mechanisms by which radiation transfers energy to biological and chemical materials
- Development of new techniques for directing and measuring various radiations used in the detection, diagnosis and treatment of cancer
- Application of radioactive tracers to diagnosis and to the study of metabolic processes
- Optimization of physical parameters for diagnostic medical imaging including radiography, computerized tomography, magnetic resonance imaging and radionuclide imaging
- Optimization of treatment plans for cancer radiotherapy
- Incorporation of biological models in radiation treatment planning
- Radiation beam modulation and image guidance applications in radiation therapy
- Motion management in patients receiving imaging or radiation therapy procedures

Molecular Biophysics & Physiology

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Molecular Biophysics & Physiology: Philosophy

The program of the graduate Division of Molecular Biophysics and Physiology provides state-of-the-art training in the most quantitatively oriented areas of modern physiology and biophysics. To this end, a limited number of students are invited to join particular research laboratories as pre-doctoral fellows, and most of the training occurs in this setting. The sole goal of the

faculty is excellence in research, and it expects to develop a nucleus of students who will become future leaders in the field.

Molecular Biophysics & Physiology: Admission Requirements

Students who desire to specialize in this program are strongly advised to obtain a broad scientific foundation, including work in the related sciences. Courses in some or all of the following fields are suggested for attainment of this objective: physics, including electronics; chemistry, including physical chemistry; mathematics, including differential equations; and molecular and cell biology or cell physiology. An applicant who holds a degree from an accredited institution will be considered for admission on the basis of the following criteria:

1. An undergraduate record of superior quality demonstrating proficiency in quantitative science
2. A well-organized plan for graduate study and research compatible with expertise in the division
3. Recommendations from at least three college faculty members acquainted with the character of the applicant
4. Ability to function in a program stressing an independent approach to the acquisition of knowledge
5. Other materials required by the division director

The Graduate Record Examination (GRE) is strongly recommended but is not required. Except in unusual cases, the minimum prerequisites for admission will be the attainment by the applicant of a 3.0 overall average ($A = 4.0$) in undergraduate studies with a 3.5 average in science courses, preferably including two years of physics or engineering, inorganic and organic chemistry, physical chemistry, advanced calculus, ordinary differential equations, and cell biology or cell physiology. Applicants for admission to the division will be initially evaluated by the division director and advisory committee. Considerations will include overall academic record, evidence of previous ability to successfully pursue independent studies, recommendations of the applicant's undergraduate faculty, and the description of the applicant's scientific research interests. The division director will determine whether additional supporting evidence would aid evaluation of the application and, if so, will make appropriate arrangements with the applicant to submit such evidence.

Applications judged by the division director to demonstrate satisfactory credentials and interests compatible with the research facilities of the faculty will then be evaluated by all faculty members with expertise in the area(s) of interest of the applicant.

Considerations in this phase will include not only academic ability but also the resources available to support research in the indicated area. An interview may be requested. Selection of applicants will be by invitation of a faculty member in the division willing and able to serve as the student's principal advisor and research sponsor after endorsement of the selection by the division director, the Graduate College Council, and the Dean. In special circumstances, exceptions to this procedure may be made for students with unusual promise but with no firm commitment to a particular area of research. In such cases, the program director will serve as interim principal advisor. Finally, in the case that the division director would be the principal advisor of a student, the physiology department chairperson shall assume the duties of division director with respect to that student.

Molecular Biophysics & Physiology: Curriculum

Usually prior to starting the program, students will have selected a faculty member as principal advisor. All students admitted to the division will be required to enroll in the medical physiology course as soon as possible after admission and before the dissertation proposal and obtain an average grade of "B" or better over all semesters. The student will—in the first two years—enroll in courses appropriate to the student's research interests as agreed upon in consultation with the principal advisor and the director of the graduate program. It is anticipated that courses deemed essential to the student's graduate training by the division occasionally will not be available in the Division of Molecular Biophysics and Physiology or other divisions of the Graduate College. In this case, arrangements will be made for the student to enroll in such courses at other institutions, and performance in these courses will be required to be at the same level as for courses at Rush. In certain circumstances, a program of supervised independent study may be recommended as an alternative to particular coursework. Individual course requirements may be exempted on the basis of a past academic record or by the successful completion of a special examination covering the content of the required course. Such exemptions will not be made automatically solely on the basis of a past academic history but will be judged on an individual basis by the division director and advisory committee. Unless waived, students will enroll in eight credit hours of coursework outside the Division of Molecular Biophysics and Physiology.

Course Offerings

The following courses will be available, subject to demand and limitation, to students within the Graduate College:

PHY-451 Physiology I
PHY-452 Physiology II
PHY-501 Medical Physiology I
PHY-502 Medical Physiology II
PHY-503 Physiology of Striated Muscle
PHY-505 Introductory Membrane Biophysics
PHY-511 Graduate Physiology I
PHY-512 Graduate Physiology II
PHY-521 Mathematical Methods for Physiologists
PHY-524 Linear Differential Equations and Transform Methods
PHY-533 Programming Numerical Methods
PHY-590 Special Topics in Physiology
PHY-598 Introduction to Physiology Research
PHY-640 Applied Electrophysiology
PHY-651 Advanced Topics in Muscle Physiology
PHY-690 Research Topics in Physiology
PHY-699 Dissertation Research in Physiology
Molecular Biophysics & Physiology: Dissertation Process

Dissertation Proposal

Upon admission to the division, the student and his or her principal advisor will begin to make preparations for a proposal upon which the student's original research project will be based. Such preparations will include intensive study of the literature in the student's field of interest, instruction in the basic laboratory skills necessary for professional development in the field, and any other requirements established by the principal advisor and division director in addition to the course requirements discussed above. No later than 36 months after admission, the candidate will present to his or her dissertation committee an original proposal for contribution to knowledge in his or her area of specialization. It will include an extensive review of the relevant scientific literature, a description of the technical aspects of the proposed studies, an outline of the anticipated experimental approach to the major problem of interest and a discussion of possible results and their interpretation. The student will be expected to defend both his or her proposal and general ability to achieve professional competence before this committee. The dissertation committee will have at least three members: the principal advisor; the division director; and,

whenever possible, an individual outside the institution with national stature in the candidate's field of interest, selected jointly by the candidate, principal advisor and division director. In addition to evaluating the content of the dissertation proposal, the outside member will have a responsibility to maintain close and frequent contact with the student and principal advisor and to advise the division director concerning the progress of the academic program. Ordinarily, the dissertation committee will be constituted as soon as possible after admission of a student to the division. The dissertation proposal may be submitted to the faculty prior to completion of course requirements in order to enable research activity to begin, but the student will not be formally admitted to candidacy until this is satisfactorily completed.

Candidacy

Upon acceptance of the dissertation proposal, the student will be admitted to doctoral candidacy and will be expected to devote fully his or her energies to the program. All students must meet a minimum residency requirement of one calendar year, following admission to candidacy, unless the division director and Dean grant special exceptions. The principal advisor will make frequent reports to the division director concerning the student's progress. Should either a faculty member or the candidate feel it appropriate, the dissertation committee can be called into session to judge the student's continued participation in the graduate program or to determine possible alterations in the area of his or her research efforts. In addition, the student and principal advisor will be expected to consult periodically with the other committee members, who may also request the division director to call formal meetings of the dissertation committee. Conflicts between the student and/or any members of the dissertation committee not resolvable by the full committee may be referred to the advisory committee of the division or higher authority as specified in the policies and procedures of the Graduate College. The degree of Doctor of Philosophy is given in recognition of high attainment and ability in a particular field of scientific research as evidenced by submission of a dissertation showing power of independent investigation and forming an actual contribution to existing knowledge. Such dissertation will be submitted to the candidate's dissertation committee for review and defended orally at least three months before the degree is granted. The dissertation committee will ordinarily request an evaluation of the candidate's dissertation by a scientist of national stature not affiliated with Rush University. Acceptance of the dissertation by the dissertation committee will be reviewed by the Graduate College Council and the Dean, along with the candidate's entire academic performance in the Graduate College. Determination of completion of all requirements will result in the Dean's recommendation that the degree

be awarded. Should the candidate not have submitted a dissertation three years after admission to candidacy, the dissertation committee will be convened to evaluate the candidate's progress and, if proper, to suggest alteration in the program.

Molecular Biophysics & Physiology: Research Activities

Theoretical Descriptions of Membrane Ion Channels:

Robert S. Eisenberg works on the mechanisms of selectivity and permeation in ion channels. Ion channels are proteins with a hole down their middle that control a large fraction of the functions of life. Once open, spherical ions like sodium, potassium, calcium and chloride move through them by electro-diffusion. Dr. Eisenberg applies modern theories of ionic solutions to simple models of ion channels, using a variety of mathematical methods, from classical Metropolis Monte Carlo to modern methods of variational calculus, the energetic variational methods used in the theory of complex fluids. These simple models have been able to reproduce the selectivity properties of the calcium channels of the heart and of the sodium channels of nerve with the same set of parameters, using the (unchanging) crystal radii of ions. Current voltage relations are just now being calculated and there are signs that at least some of the properties of transporters and of (spontaneous) gating may emerge from models of this sort, without explicit structural changes.

Dirk Gillespie uses theories of liquids (like density functional theory, or DFT) to model ion movement. All projects have a very close relationship with experimental groups that provide data and test the models' predictions. Of particular interest are:

- Ryanodine receptor (RyR) and L-type calcium channels in muscle, which are involved in initiating muscle contraction, to understand how ions move through these pores (permeation) and why some kinds of ions are preferentially conducted (selectivity). The physiological consequences of these mechanisms (and their disruption in disease states) are also studied.
- Ca^{2+} -induced Ca^{2+} release (CICR) in which the Ca^{2+} released by one RyR opens neighboring RyRs, which in turn open other RyRs. The goal is to understand the mechanism of CICR, the mechanism for stopping CICR, and changes in CICR during disease states.
- Understanding and developing new nonbiological nanofluidic devices, devices that move electrolytes through nanometer-sized pores in manmade materials to create current. The goal is to understand their physics and to predict new unique device properties for future applications.

This lab is best suited for those with a background in physics and math who are interested in using, developing or implementing new modeling techniques, within an environment of collaboration with both theorists and experimentalists.

Gillespie, D. 2008. Energetics of divalent selectivity in a calcium channel: The ryanodine receptor case study. *Biophys. J.* 94:1169-1184.

Gillespie, D., and M. Fill. 2008. Intracellular calcium release channels mediate their own countercurrent: The ryanodine receptor case study. *Biophys. J.* 95:3706-3714.

He, Y., D. Gillespie, D. Boda, I. Vlassiuk, R. S. Eisenberg, and Z. S. Siwy. 2009. Tuning transport properties of nanofluidic devices with local charge inversion. *J. Am. Chem. Soc.* 131:5194-5202.

Proton Channels and NADPH oxidase. The main interest of **Tom DeCoursey's** laboratory over the past decade has been in two molecules that reside in the membranes of white blood cells. These are proton channels and NADPH oxidase. Both play vital roles in white blood cells when these cells kill bacteria and other microbial invaders. When NADPH oxidase does not work, white cells cannot kill many types of bacteria. Patients afflicted with hereditary chronic granulomatous disease (CGD) lack this enzyme, and if not treated often die in childhood of recurrent infections. Dr. DeCoursey's laboratory has shown that inhibiting proton channels prevents NADPH oxidase from working (DeCoursey et al., 2003, *Nature* 422:531-534) and that this results from the effects of proton channels on membrane potential and pH (Morgan et al., 2009, *Proc. Natl. Acad. Sci. USA* 106:18022-18027). They found that in human basophils, inhibiting proton channels prevents histamine release (Musset et al., 2008, *Proc. Natl. Acad. Sci. USA* 105:11020-11025). Others found that proton channels control sperm maturation. The DeCoursey laboratory continues to investigate roles played by proton channels in a variety of cells, such as B lymphocytes (Capasso et al., 2010, *Nature Immunol.* 11:265-272). They recently discovered a new proton channel gene in a dinoflagellate, which triggers the bioluminescent flash produced by these creatures when seawater is disturbed at night (Smith et al., 2011, *Proc. Natl. Acad. Sci. USA* 108:18162-18168).

Another focus of their current research is understanding how the proton channel works on a molecular scale. Because the proton channel gene was identified only in 2006, much work remains to be done. They design mutations to the protein, express the mutant channels in cultured cells and then record electrically from the cells to determine how the mutation affected the function of the molecule. For example, they found that the regulation of channel activity by phosphorylation occurs

at a specific threonine residue in the intracellular part of the channel (Musset et al., 2010, *J. Biol. Chem.* 285:5117-5121). The figure shows how they believe the proton channel dimer is assembled (Musset et al., 2010, *J. Physiol.* 588:1435-1449). Very recently, this laboratory identified the "selectivity filter" of the human proton channel (the part that allows only H⁺ and no other ions to go through the channel) (Musset et al., 2011, *Nature*, 480:273-277).

Viral Fusion. Viruses deposit their genetic material into cells by fusing to membranes, initiating infection. Some viruses fuse directly to plasma membranes and others are internalized into endosomes where low pH triggers fusion. In both cases, the nucleocapsid leaves the viral interior by moving through the fusion pore into cytosol. Without fusion, the virion cannot infect the cell. There are three classes of viral fusion proteins. All types of viruses that utilize class II or class III proteins initiate infection by fusing from within endosomes. **Fredric Cohen's** laboratory has found that fusion induced by class II and class III viral proteins (but not class I) is dependent on the voltage across the target membrane. If the voltage across an endosomal membrane was pharmacologically controlled, infection may be prevented. Furthermore, the similarity in structure of all class II proteins and the similarity between all class III proteins suggests that identifying a voltage sensor for one virus of a class should readily yield the sensor for many. The Cohen laboratory has also found that viral fusion mediated by class II or class III proteins varies with redox potentials, but fusion mediated by class I proteins do not. The range of values of redox potentials within interiors of endosomes differs for different types of endosomes. Variation of redox potentials can provide an important control for conformational changes of viral fusion proteins within endosomes. This has both conceptual and practical ramifications. Not all viruses within endosomes fuse and even a particular type of virus can enter cells through multiple endosomal pathways. The variation in redox potentials for endosomes of different pathways would account, at least in part, for variations in fusion and infectivity of virus within endosomes. This laboratory is pursuing the mechanisms by which membrane potentials and redox potentials regulate fusion and are characterizing how these two cellular controls of membrane fusion interact to guide fusion.

Membrane Cholesterol. Since so much of cellular biology in both health and disease is sensitive to cholesterol levels, experimentalists often measure cholesterol concentration under a wide variety of conditions. But from a physical point of view, the free energy of a system is the fundamental parameter that quantifies the tendency of a molecule to transfer from one state (or phase) to another. If each molecule is independent of all others, exhibiting zero interactions, the free energy is a function of

the molecules' concentrations. But for real materials, interactions between molecules alter the tendency to exchange between states. The free energy of transfer is then a function of the molecules' "activity," a thermodynamic parameter that accounts for interactions and that is an "effective concentration." Determining activity allows one to infer the strength of molecular interactions. Although the difference between concentration and activity is a basic textbook distinction, a convenient and reliable method to measure cholesterol activity had not been developed. **Fredric Cohen's** laboratory has now overcome this limitation, allowing us to thermodynamically characterize the dynamics of membrane cholesterol levels in living cells during physiological processes. This laboratory is currently investigating the changes in membrane cholesterol that occur during two important biological processes: cell proliferation stimulated by activation of the epidermal growth factor receptor (EGFR) and glucose uptake into cells as regulated by insulin. Their work demonstrates that activation of a signaling cascade leads to changes in cholesterol activity and that these changes in cholesterol activity negatively feedbacks on the signaling cascades, providing a mechanism for cellular homeostasis.

Regulation of Intracellular Calcium:

Eduardo Rios studies the workings of muscles, including skeletal and cardiac. The goal of this laboratory is to understand the cellular function of excitation-contraction (EC) coupling in terms of fundamental mechanisms. EC coupling translates electrical changes at the cell membrane to signals coded as increase in cytosolic Ca^{2+} signals that result in muscle contraction. The mouse deploys extremely rapid calcium signals in its muscles, made possible by fast opening and closing of molecular channels that allow calcium to cross the walls of its cellular stores. In a working human, this gating is also very fast. But too much calcium may have unintended consequences, as it can become a signal that literally tells cells to start dying. So, for the stability and health of muscle and other cells, that calcium signal is precarious, based on delicately tuned controls that must be as good at opening channels as they are at closing channels to terminate the signal. The Rios laboratory has helped define the key molecular players in these functions. They use the mouse to study Ca^{2+} controls, comparing their operation and mechanisms in the healthy cell and in mice that have molecular abnormalities that copy human disease. The information and implications derived from these studies may apply to similar alterations in the heart, which lead to an irregular beat and may cause sudden death. Calcium signals also rule brain function, gut movements and blood pressure. This laboratory's work has contributed and should continue contributing to the understanding of these functions and their diseases.

Thomas Shannon is interested in ionic channels, voltage gated ionic channels, fluorescence signal detection and electrophysiology, particularly as they relate to excitation-contraction coupling in striated muscle. Dr. Shannon uses multiple biochemical and biophysical approaches to study the control of the load of calcium in the storage organelle (the sarcoplasmic reticulum) of normal and abnormal cells of the heart. He has demonstrated on beating heart cells that the load in the normal sarcoplasmic reticulum is released partially to the cytosol in the process of a heartbeat. Quantitative determination of these released fractions will allow him to understand the mutual interactions of Ca load (i.e., sarcoplasmic reticulum Ca concentration) and Ca release, and thus the control of contractile force, an important determinant of cardiac ejection (blood flow) in health and disease. For instance, Dr. Shannon has also demonstrated that the SR Ca load is reduced during heart failure, and his research suggests that this reduction may be a critical factor in causing reduced cardiac contraction in this condition. Ongoing experiments are aimed at determining what causes this reduced SR Ca load.

The research program led by **Lothar A. Blatter** focuses on the role of calcium ions for the regulation of cellular functions in the cardiovascular system. On the one hand they investigate, at the cellular and subcellular levels, through which pathways and mechanisms calcium itself is regulated in cellular compartments such as the cytosol, the nucleus, the sarcoplasmic reticulum and mitochondria. On the other hand they study how specific changes in cellular calcium concentrations control functions of cardiac myocytes and vascular endothelial cells. Of particular interests in cardiac cells are the regulation of calcium during excitation-contraction coupling, i.e., the rhythmic elevations of calcium that lead to contraction with every heartbeat, and in excitation-transcription coupling where this laboratory investigates the sources and specific roles of calcium for the activation of transcription factors (such as NFAT) that are involved in pathological cardiac remodeling. They are further interested in studying the specific changes in calcium signaling that occur in the diseased heart, i.e., in cardiac hypertrophy, heart failure and arrhythmias. In vascular endothelial cells they are interested in the interplay between calcium signaling and the generation of nitric oxide, an important endothelium-derived relaxing factor through which the vascular endothelium contributes to the control of blood flow and blood pressure. In both tissue types, an important area of research centers around the role of mitochondria for cardiovascular function. This research investigates the contribution of mitochondria to the regulation of cytosolic calcium concentration through its capability of storing and releasing calcium ions, but also the role of calcium ions

for the regulation of mitochondrial functions, including energy metabolism and ATP production, regulation of mitochondrial channels such as the mitochondrial permeability transition pore, and control of the cellular redox state and protection against oxidative stress. For the study of these signaling processes and pathways this laboratory employs a wide palette of methodological approaches, ranging from high resolution confocal imaging using a large spectrum of fluorescent probes, to electrophysiology (patch clamp and lipid bilayer single channel recordings), photolysis of caged compounds, molecular biology and biochemical approaches, and the use of transgenic animals.

Michael Fill focuses on defining the mechanisms that control intracellular calcium signaling in excitable cells. They are particularly interested in the origin/control of local intracellular calcium signals generated by ryanodine receptor (RyR) channels. RyR channels are found in almost all cells and modulate cellular processes as diverse as contraction, secretion, synaptic transmission and transcription. However, most of this laboratory's studies have focused on single RyR local control in mammalian striated muscle, where RyRs are found in abundance. Their research has delineated fundamental biophysical mechanisms important to normal or pathological muscle function. They generally apply a multiscale experimental approach that is best illustrated by their published works. Some recent works are listed below.

Qin et al. Ryanodine receptor luminal Ca²⁺ regulation: Swapping calsequestrin and channel isoforms. *Biophys. J.* 97(7):1961-70, 2009.

Liu et al. Flux regulation of cardiac ryanodine receptor channels. *J. Gen. Physiol.* 135(1): 15-27, 2010.

Ramos-Franco et al. Ryanodol action on calcium sparks in ventricular myocytes. *Pflugers Arch.* 460(4):767-76, 2010.

Porta et al. Single ryanodine receptor channel basis of caffeine's action on Ca²⁺ sparks. *Biophys. J.* 100(4):931-8, 2011.

Zhou et al. Carvedilol and its new analogs suppress arrhythmogenic store overload-induced Ca²⁺ release. *Nature Med.* 17(8):1003-9, 2011.

Neurosciences

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Neurosciences: Philosophy

The Division of Neurosciences of the Graduate College offers interdisciplinary education in the field of neuroscience at the doctoral level to prepare students for careers in teaching and research. The program is one of the few in the country that emphasize disease-oriented basic neuroscience and is funded by an NIH Training Grant. The diversity of interest and expertise among the faculty of the division provides students with educational and research opportunities in neurophysiology, neuroanatomy, neuroimaging, neurochemistry, and cell and molecular biology—all of which are important for the understanding of the functions of the intact and diseased central nervous system. The resources at Rush and in the Department of Neurological Sciences allow students the unique opportunity to carry out independent research on the basic neurobiological substrates of various neurological disorders.

Neurosciences: Admission Requirements

Designed for students interested in teaching and interdisciplinary research careers in the neurosciences, the program also accepts students with an undergraduate or medical degree as well as other professional students wishing to pursue graduate study. Students are admitted for entry during the fall semester of a given academic year. Applicants for admission are evaluated by an admissions committee chaired by the director of the division. Candidates are required to provide three letters of recommendation written by individuals who know them academically. Consideration for admission includes the applicant's overall academic record, the quality of the recommendations, his or her motivation and ability to pursue independent studies and the description of the applicant's scientific research interests. Minimal admission criteria to the program are consistent with the general requirements of the Graduate College and include competitive scores on the Graduate Record Examination (GRE) and a grade point average of at least 3.0 on a 4.0 scale.

The program is not accepting any new students.

Neurosciences: Curriculum

The program is preceptor-based. The study and research schedule outlined below should be completed within four to five years of full-time study beyond the bachelor's degree. The program follows the minimal residence requirement established by the Graduate College. During the first two years, students are expected to complete required coursework (and any deficiencies). First-year required courses consist of the Graduate College core curriculum courses, the Rush Medical College Medical Neurobiology (NEU-502) course and Introduction to Physiology/Pharmacology (PHR-504). Graduate students are expected to receive a grade of at least "B" in these courses. In the fall term of the second year of study, all students are required to enroll in and pass a statistics and experimental design course (NEU-544). During the first two years of study, students rotate through various laboratories involved in the program and learn techniques commonly in use in neuroscience laboratories. The requirement is mastery of four techniques outside any of those used by the student in his or her research. The major required course in the second year of study is an Advanced Neuroscience Proseminar (NEU-591) taught jointly by participating faculty. A seminar format that encourages extensive discussion and student participation is used. A course titled "Selected Topics in Neuroscience" (NEU-690) is available to advanced students (in their third or fourth year of residence) for credit. The offerings in this course change from year to year depending on demand and interest, and the course is taught by different faculty members. In addition to coursework, students are encouraged to participate in and carry out independent research in their first two years of residence.

Required courses in the first two years of study:

Year 1		Credits
Fall Semester		
GCC-501	Molecular Biology: Genome to Proteome	2
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	2
GCC-511	Readings in Molecular Biology	1
GCC-512	Readings in Cellular Biology	1
GCC-520	Introduction to Physiology/Pharmacology I	3
NEU-598	Pre-dissertation Research	1-9
Spring Semester		
GCC-503	Functional Cell Biology	1
GCC-504	Functional Tissue Biology	2
GCC-506	Biomedical Ethics	1
GCC-513	Readings in Functional Cell Biology	1
GCC-514	Readings in Functional Tissue Biology	1
GCC-507	Medical Research Strategies	2
GCC-508	Writing Practicum	2
NEU-502	Medical Neurobiology	6
NEU-598	Pre-dissertation Research	1-9
Summer Term		
NEU-511	Techniques in Neuroscience	2
NEU-598	Pre-dissertation Research	1-9
Year 2		Credits
Fall Semester		
NEU-511	Techniques in Neuroscience	2
NEU-544	Statistics and Experimental Design for Neuroscience	2
NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-Dissertation Research	1-9
Spring Semester		
NEU-511	Techniques in Neuroscience	2
NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-dissertation Research	1-9
Summer Term		
NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-dissertation Research	1-9

Neurosciences: Academic Policies

Students are required to pass a combination of written and oral comprehensive examinations toward the end of the second year and after completion of the required coursework. Students failing the comprehensive examinations are given a second chance three months later. A second failure results in termination. Throughout the first two years of required coursework, students whose grade point average falls below a “B” (3.0) will be placed on academic probation. If a student fails to remedy this average, he or she will be asked to withdraw from the program. A student who completes the comprehensive examinations successfully is admitted to candidacy and qualifies for the doctoral dissertation proposal defense. Students choose a preceptor to supervise their research during the first year of residence. The preceptor and the student gather an advisory committee that is chaired by a core faculty member of the program and includes the preceptor and four other members, two from within the program, one from another division within the institution, and one neuroscientist from another institution. The thesis proposal should be in the format of an NIH RO1 grant application and will be defended before the advisory committee. The rest of the student’s time in residence is spent on the doctoral dissertation research. Each student dissertation is evaluated by a neuroscientist from another institution who is an expert in the specific area of research.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Neurosciences: Research Activities

The background and expertise of the faculty cover a broad range of fields within the neurosciences such as behavioral and cognitive neuroscience, neuroimaging, neurophysiology, neuroanatomy, cell and molecular biology, etc. Research among the faculty is especially strong in the following areas: transplantation and regeneration; gene therapy; the neurobiological bases of normal memory and of its dysfunction; aging; and the neurobiological bases of degenerative disorders such as Alzheimer’s disease, Parkinson’s disease, Huntington’s disease and multiple sclerosis. Thus, depending on interest, numerous interdisciplinary research areas are available to the student.

Nursing Science: Curriculum

Doctor of Philosophy (PhD)

Nursing Science

Theory Courses		Credit Hours
NSG-680	Understanding Scientific Paradigms	3
NSG-681	Understanding Theoretical Framework Development	3
Subtotal		6
Statistics Courses		Credit Hours
NSG-522	Applied Epidemiology & Biostatistics for Nursing Practice	3
NSG-684	Intermediate Statistics	3
NSG-685	Multivariate Statistics	3
Subtotal		9
Research Courses		Credit Hours
NSG-686	The Research Process: Quantitative Design & Methods Part I	3
NSG-687	The Research Process: Quantitative Design & Methods Part II	3
NSG-688	The Research Process: Qualitative Design & Methods	3
NSG-691	Advanced Clinical Research Practicum (ACRP)	8
Subtotal		17
Ethics Course		Credit Hours
NSG-683	Ethical Conduct in Research Settings	3
Subtotal		3
Role Courses		Credit Hours
NSG-614	The Leader and Policy, Politics, Power, & Ethics	3
NSG-600	Leadership in Evolving Healthcare Environments Power, & Ethics	3
NSG-690	Grantsmanship	3
NSG-679	Academic Scholarship in Nursing <i>Variable credit based on prior teaching experience</i>	3
Subtotal		12
Cognates		Credit Hours
Subtotal		8
Dissertation		Credit Hours
NSG-699	Dissertation	12
Subtotal		12
Independent Study		Credit Hours
NSG-900A	Independent Study	Varies

Please see the College of Health Sciences section of the catalog for the full program description and general administrative information.

Pharmacology

Note for the Current Academic Year:

Incoming PhD students should refer to the Integrated Biomedical Sciences section of this catalog. The following information is intended for incoming MS, current MS and current PhD students. Questions about the future plans should be directed to the program director.

Pharmacology: Philosophy

The Doctor of Philosophy (PhD) and Master of Science (MS) programs offer training in pharmacology and biomedical research. The Division of Pharmacology believes that a sound training in medical pharmacology and cell biology should be integral to a pharmacology research degree, and students are trained in both disciplines in the first year. A student then does research in a selected area of biomedical sciences. During the course of the research, emphasis is placed on developing the student's understanding and communication of research.

Master's students complete all coursework and research in two years and submit a thesis. Graduates of the master's program have the skills necessary to work in laboratories in both academia and industry, and have a fundamentally sound knowledge of pharmacology. The vast majority of MS graduates find job opportunities or successfully matriculate in advanced training programs within three months of graduation.

For PhD students, the research in the first two years is aimed at developing a novel research proposal. PhD students continue research over the next three years and are required to complete a dissertation and publish novel scientific findings in peer-reviewed journals with at least one first-author manuscript submitted by the student. The ultimate outcome of the PhD research experience is the development of an independent investigator who has the necessary scientific skills and credentials to pursue a career in either an industrial or academic setting.

Pharmacology: Admission Requirements

Applicants must enter the program in the fall semester in order to begin the required coursework in the core curriculum. The deadline for submission of applications is generally March 1. International applications can be accepted after March 1 but must take into consideration the delays associated with the necessary visa arrangements. In addition to the basic requirements established by the Graduate College, the division has the following requirements for admission to its program:

- The baccalaureate degree from an accredited college should include a background in biological, physical or quantitative sciences.
- Coursework in biology, cellular biology, molecular biology, physics, chemistry, organic chemistry, physical chemistry and mathematics, including calculus, is highly recommended. Upper-level biochemistry or physiology courses are also highly recommended.
- The Graduate College requires academic transcripts from all baccalaureate and post-baccalaureate educational experiences. These should provide a minimal grade point average of 3.0 overall (A = 4.0). The pharmacology admission committee also looks for higher grades in science courses and evidence of research experience. Competition for PhD candidates is significantly higher. The Graduate College requires all graduate students to take the GRE examinations, and scores on these tests are considered by the admission committee. All applicants whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL). Applicants from foreign countries must have their transcripts evaluated by an independent agency (i.e., ECE and WES).
- As required by the Graduate College, a clear, concise expression of the applicant's interests and goals needs to be included as an essay in the application. Identifying a particular area of interest within the field of pharmacology is very helpful in identifying potential laboratories for the students.
- The Graduate College requires three letters of recommendation, and it is recommended that they be from science faculty who can evaluate the character of the applicant, the applicant's academic and research performance, and the applicant's ability to think and work independently.

The division director and the Admissions Committee evaluate applications. All prior academic experience and the letters of recommendation will be evaluated for an indication of the applicant's potential for success as a graduate student and future independent investigator. The statement by the applicant describing goals and motivation will be studied to determine the compatibility between the applicant's requirements and the capabilities of the graduate program. With rare exceptions, PhD applicants will be required to appear for an interview with faculty members before admission to the program.

Students applying for the master's program will meet the same set of minimum standards as those applying for the doctoral program. Students applying for the master's program are encouraged to visit the department, although a formal interview is not required.

The number of faculty available to mentor the students' research limits acceptance into both the master's and doctoral programs. Students are therefore encouraged to apply early. Students entering the master's program will not be eligible for stipends and must pay tuition.

Acceptance into the doctoral program is limited by the availability of faculty and also by the availability of stipends. All accepted doctoral students receive a competitive stipend and tuition scholarship. The stipend and tuition scholarship is renewed each year providing the student is making satisfactory progress towards the degree.

Pharmacology: Curriculum

When the applicant enters the program, a research advisor is assigned, and the student begins directed research on an active project. In the first two semesters, there is minimal research as

classroom studies are emphasized. During these terms, both master's and doctoral Graduate College students take the Graduate Core Curriculum (GCC) classes and required pharmacology (PHR) courses. The summer term is devoted to laboratory research. Research and advanced pharmacology courses provide the core of the second-year studies. For the master's and doctoral students, the research experience differs in the second year. The master's students are involved in a directed research project, while the doctoral students are developing a novel research project.

A typical course sequence is described as follows:

Year 1		Credits
Fall Semester		
GCC-501/511*	Molecular Biology	2/1
GCC-502/512*	Cellular Biochemistry	2/1
PHR-691	Seminar in Pharmacology	1
GCC-520	Pharmacology /Physiology I	3
BTN-525	Experimental Design & Models of Disease	2
Spring Semester		
GCC-503/513*	Functional Cell Biology	1/1
GCC-504/514*	(2) Functional Tissue Biology	2/1
GCC-506	Research Ethics	1
GCC-507	Biomedical Statistics	2
GCC-521	Introduction to Physiology and Pharmacology II	3
PHR-691	Seminar in Pharmacology	1
PHR-598	Research in Pharmacology	1
Summer Term		
PHR-598	Research in Pharmacology	9
Year 2		
Fall Semester		
PHR-593	Introduction to Grantsmanship	1
PHR-595	Readings in Pharmacology	1
PHR-691	Seminar in Pharmacology	1
PHR-563	Advanced Concepts in Pharmacology	3
PHR-598	Research in Pharmacology	Variable [†]
Spring Semester		
GCC-508	Writing Practicum	2
PHR-594	Structure, Function and Pharmacology of Cell Receptors	3
PHR-595	Readings in Pharmacology	1
PHR-691	Seminar in Pharmacology	1
PHR-598	Research in Pharmacology	Variable [†]

GCC = Graduate Core Curriculum – These classes are taken by Master's and Ph.D. students from a variety of different Graduate College Programs. These provide a basic understanding in the Biomedical Sciences and acquaint the students with the Biomedical literature.

*511,512,513 and 514 are 1 hr reading courses associated with 501, 502,503 and 504 respectively.

[†] MS students need to take a total of 10 hrs in Fall and Spring of the second year in order to graduate with the appropriate number of credits. PhD students are restricted to 9 credit hrs after the first year

BTN = Biotechnology course – Taken with the Biotechnology students, serves as an introduction to experimental design and models of Disease
PHR = Pharmacology specific courses.

For doctoral students, the emphasis is on research in years three through five, and a typical registration is as listed below. While registrations appear similar in years three through five, the nature and character of the research changes and the student passes through a number of steps towards completing his or her doctoral degree.

Years 3 through 5		
PHR-590	Special Topics in Pharmacology OR	
PHR 595	Readings in Pharmacology OR other Elective*	Variable
PHR-691	Pharmacology Seminar	1
PHR-699	Dissertation Research	8

* Electives may be selected from any graduate program at Rush. Approval of mentor is necessary. A total of 9 semester hours of elective credit is required. Electives may be taken as pass/no-pass or for a letter grade. **Special topics courses or readings** courses are offered by faculty to assist the student in developing expertise in a particular area. These courses count towards the student's elective requirements. These courses may be developed by the faculty for a particular student to address an area of knowledge needed for the student's development, or can be open for a wider audience. Registration for these courses requires permission of the instructor.

The Division of Pharmacology reserves the right to revise courses, and the student may be required to take the replacement courses. Such a requirement would not apply to students who have already taken a course.

Minimal Credit Hours Required for MS and PhD Degrees

Typically, the 53 credit hours accumulated in the five semesters listed above are necessary for the completion of a Master of Science (MS) degree. However, a student with advanced training in a related field may complete the MS degree by completing one year of study (36 semester hours). For example, this option is available to individuals with advanced degrees who wish to develop research skills. Such applicants have already covered many of topics in the GCC courses and may have taken medical pharmacology courses. These applicants will spend the bulk of their time on research, and take research-related courses (e.g., Medical Research Strategies, Writing Practicum, seminars and advanced pharmacology courses, etc.) provided the faculty waive didactic requirements.

The doctoral degree is generally completed within five years. Advanced students entering with a master's (MS) degree in pharmacology or a doctor of medicine (MD) degree may have classes in the first two years waived based on their prior record. The degree may then be completed in a shorter time providing

the student progresses through the process outlined below. The advanced student must be enrolled full-time at Rush University for at least two academic years, including one summer, for a total of 63 credit hours. All MS and PhD students must be enrolled at Rush in the semester they graduate.

Pharmacology: Thesis/Dissertation Program Progression

Master's Program

Research Overview

During the summer of the first year, the student selects a research project in conjunction with a faculty mentor. The research project is designed to advance knowledge in a specific discipline and to yield a scientific publication for the student.

With approval by the program director, a student may write a scholarly work in lieu of a research project, in which case a committee must still be formed to oversee the work and a public presentation of that work must be given.

Academic Advisor/Principal Advisor

The graduate division director functions as the academic advisor to the student during the first year. The program director determines the course schedule and monitors the student's progress. In the summer, a principal advisor or mentor is selected from the faculty of the Division of Pharmacology. The advisor then accepts the supervisory role in the development of the student as a scientific investigator.

Thesis Research

The advisor will work with the student to develop a research project that can be completed within the framework of the program. The student together with the advisor will form a thesis committee composed of three members: the advisor (who must be a member of the Graduate College) and two readers. The readers will assure the quality of the document. In addition, the director of the Pharmacology graduate division and the chair of the Pharmacology department are ex officio members of all thesis committees. The director of the graduate program and the chair of Pharmacology may also serve as committee members (readers) if asked, or as an advisor if mentoring the student.

Master's Thesis

A written thesis, describing work accomplished, is required to be completed by all master's students by the end of the second year. The thesis committee reviews the thesis. The thesis is presented to the University community in an open meeting at

the conclusion of the training period. The thesis may or may not reflect original work. However, original work that is published in peer-reviewed journals is a goal. Upon completion of the thesis, the student will present the findings in a public forum open to the University. At least two members of the committee that includes the student's advisor must sign off on the thesis. Following the approval of the thesis committee, the program director must certify the completion of the thesis and all requirements for the MS degree. The director of the Library of Rush University Medical Center must then approve the formatting of thesis before its acceptance by the Library of Rush University.

Completion of the Degree

The Office of the Registrar must be notified of impending completion of the degree by submission of an Intent to Graduate form at the beginning of the final term. As the thesis is reaching final form, the student should consult with the University librarian to assure that the thesis will be formatted correctly. Upon thesis approval, the student completes a final checklist to assure the necessary approvals. During this time the student will be required to have an exit interview and provide feedback concerning his or her experience at Rush University.

PhD Program

Research Overview

During the first and second years, the student selects a research project in conjunction with a faculty mentor. The student and mentor then select a committee of faculty to guide the student's research activities. This committee approves the proposed research project and determines when the student has completed his or her dissertation. The research project is designed to advance knowledge in a specific discipline and to yield first-author scientific publications for the student. Research internships at pharmaceutical companies may also be available to the students and are designed to enhance the research activities of the student.

Academic Advisor/Principal Advisor

The graduate division director functions as the academic advisor to the student during the first year. The director during this time determines the course schedule with the student and monitors the student's progress. Beginning in the first year, the student is expected to gain laboratory experience. This activity is intended to lead to the definition of research interests and to the selection of a principal advisor or mentor from the faculty of the Division of Pharmacology. The advisor then accepts the supervisory role in the development of the student as a scientific investigator.

Qualifying Exams

By the end of June of the second year, the student will be expected to take the qualifying exams. Written exams will last two full days and cover all aspects of the basic principles of pharmacology through essay questions provided by the faculty. Each exam question may be graded by multiple faculty members and reviewed by a faculty committee. Passing the comprehensive exam allows the student to move on to the research phase.

Dissertation Research Committee

After passing qualifying exams, the student and mentor select a research committee. This committee advises the student and evaluates the dissertation. The Graduate College requires that the committee include the student's mentor/advisor and at least one other member of the Division of Pharmacology. It is also mandatory that there be one outside faculty member from either another Rush department or another institution. We require that a majority of the members of the five-member committee be faculty at Rush who are members of the Graduate College. The chair of this committee, who cannot be the student's mentor/advisor, will be chosen at the first committee meeting and will preside at all subsequent meetings and arrange for a timely completion of the dissertation work. The dissertation committee strives for consensus in all its actions. A majority vote of the committee's membership, however, is sufficient for all activities except the final approval of the dissertation.

In addition to the five committee members, the director of the Pharmacology Graduate Division and/or the chair of the Pharmacology Department serve as ex officio members of the committee. Ex officio members can participate in the meetings but cannot vote. However, either the chair of Pharmacology or the division director is eligible to be selected to the five-person committee as full members of the committee and can vote in this circumstance.

Dissertation Proposal and Presentation

The student will propose a publication-grade research project. The research project will include a review of relevant literature, a Specific Aims section that includes clear research goals, a Significance section that includes an evaluation of the potential impact of the project, and an Innovation section that includes a discussion of how this proposal departs from the literature and offers new conceptualizations or methods. The Approach section then details preliminary data and proposed experiments and methods. A detailed bibliography over all sections is required. The Specific Aims, Significance, Innovation and Approach sections will take the form of an NIH grant application (R-21). The students should follow the NIH grant application guidelines

in completing the proposal. The dissertation proposal must be presented at a department seminar and approved by the student's committee. It forms the basis for the student's continued research. The dissertation committee must meet at least twice before the student is considered for graduation. Upon completion of all experiments agreed to by the dissertation committee, the student will present the dissertation to the University in written form (approved by the director of the Library of Rush University Medical Center) and present the work in a public one-hour lecture attended by the dissertation committee and faculty of the University. The dissertation committee then meets in closed session to approve the dissertation. Typically the meeting immediately follows the public lecture. In line with the rules and procedures of the Graduate College, the committee strives for a consensus, but the dissertation can be approved over the objections of a single committee member. However, if two committee members disapprove the dissertation, then it is not approved. The awarding of the PhD degree requires the demonstration of a capability for independent research and a contribution to scientific knowledge.

Completion of the Degree

The Office of the Registrar must be notified of impending completion of the degree by submission of an Intent to Graduate form at the beginning of the final term. As the dissertation is reaching final form, the student should consult with the University librarian to assure that the dissertation will be formatted correctly. Upon dissertation approval, the student completes a final checklist to assure the necessary approvals. During this time the student will be required to have an exit interview and provide the college with feedback concerning his or her experience at Rush University.

Pharmacology: Academic Policies

To remain in good standing, the Graduate College requires that a student maintain an overall "B" average. It is also expected that all grades in required pharmacology courses will be "B" or better. Required courses must be taken for a letter grade, while other courses may be taken as pass/no pass.

Students are expected to attend all classes and spend the appropriate time in the lab. All outside employment is strongly discouraged as it interferes with the time and effort necessary to complete the program.

Students are expected to conduct themselves in a professional manner. This includes respecting the rights of others and being kind and courteous to students, faculty/staff and patients. Intimidation of other students and faculty/staff will not be tolerated and is grounds for dismissal. Sexual harassment as well as harassment related to race, color, religion, sexual orientation, national origin, ancestry, age, marital or parental status, or disability is prohibited. The Rush University Catalog details the policies regarding inclusion of minorities and those with disabilities as well as the policies and procedures for reporting harassment.

Students working with laboratory animals must follow Institutional Animal Care and Use Committee (IACUC) guidelines and will be subject to disciplinary action in the case of abuse.

The Division of Pharmacology follows the University Policies on Academic Honesty and the University Statement on Student Conduct. Students are expected to abide by the Graduate College Honor Code.

Student Grievance Procedure

Numerous checks are in place to assure the fair treatment of students. For example, a faculty committee reviews the comprehensive exams. Likewise, the chair of the advisory committee is intended to be a student advocate who must ensure the timely graduation of the student. In addition, a plan for resolving any grievance involving a graduate student in this division is in place. These written procedures are available in the pharmacology student/faculty handbook and the office of the director.

Graduate College/Rush University Academic Policies

Academic policies specific to the Graduate College are located earlier in this catalog. In addition, the Academic Resources and Policies section of this catalog contains Rush University academic policies.

Pharmacology: Doctoral Tuition Scholarship and Stipends

All accepted doctoral students receive a stipend and a tuition scholarship. The stipend and tuition scholarship are renewed each year providing the student is making satisfactory progress towards the degree and is not on academic probation.

Pharmacology: MS Tuition

MS students are enrolled on a full-time basis and pay tuition; there is no stipend. The Graduate College has offered a scholarship to cover the summer semester tuition for MS students in previous years. However, this scholarship is dependent on available funds. The acceptance letter to the successful applicant will confirm the availability of the scholarship for each student.

Pharmacology: Graduation Requirements

The student must complete all required courses except for those waived by the graduate committee and have completed the minimally required course hours as detailed in the curriculum section. For both the master's degree and the doctoral degree, the student's committee must approve the thesis or dissertation, respectively, and have the completed document accepted by the graduate program director and the University librarian. In addition to these requirements, all PhD candidates will be required to attend at least four ethics seminars a year following completion of their first academic year in order to ensure ongoing training.

Pharmacology: Faculty Research Interests

Dr. Abde Abukdeir's interests include the identification of tumor-specific genetic alterations that may be exploited as targets for therapy, the early detection of breast cancer, and the identification of treatment resistance. The goals are to perform research that is translatable to the clinic and to train the next generation of biomedical researchers through classroom instruction and laboratory mentorship.

Dr. Animesh Burea is working to establish an early detection tool for ovarian cancer targeting tumor associated neo-angiogenesis. Because it is difficult to study in humans, research is done using laying hens — the only widely available spontaneous model of ovarian cancer. Focus is on developing an early detection method based on noninvasive contrast enhanced targeted ultrasound imaging in combination with circulatory and cellular markers of tumor associated neo-angiogenesis.

Dr. Xiu-Ti Hu investigates the cellular mechanism of cocaine withdrawal, which is associated with the chronic cocaine-induced neuroadaptations in voltage-gated ion channel function and signaling in the mesocorticolimbic system (as known as the reward pathway), particularly in the medial prefrontal cortex (mPFC) and nucleus accumbens (NAc). Recent work has expanded to include investigations into neuroAIDS.

Dr. Hazel Lum investigates mechanisms of inflammatory injury of vascular endothelium, leading to increased permeability and leukocyte extravasation. Specific projects include study of pro-inflammatory lipids such as lysophospholipids and their receptors, signaling intermediates (i.e., Rho GTPases, PKC) and remodeling of endothelial junctional complexes.

Dr. Celeste Napier examines changes in the adult mammalian brain that alter motivative behaviors, including those associated with drug addiction. Behavior, electrophysiological and biochemical approaches are used in rodent models of the human addict to ascertain neuronal substrates that are altered during this disorder. Dr. Napier is also director of the Center for Compulsive Behaviors and Addiction.

Dr. Dan Predescu performs research in vascular biology with emphasis on endothelial heterogeneity cellular signaling, signaling to and from cytoskeleton, inter-endothelial communications and endothelial interaction with themselves and with their surroundings. His special interest is on the development and adequate usage of molecular methods, particularly the one related to gene expression and gene activity control.

Dr. Sandra Predescu uses cell and molecular biology approaches, imaging techniques and animal models to understand the cellular and molecular mechanisms of transendothelial exchanges between the blood plasma and the interstitial fluid in normal and pathological states. Emphasis is on the role of intersectin proteins in regulating caveolae endocytosis and transcytosis in the lung microvasculature, the signaling events that regulate endothelial cell survival, growth and proliferation, vesicular trafficking and actin cytoskeletal remodeling.

Dr. John Somberg is interested in cardiovascular pharmacology with specific interest in drugs that affect the rapid potassium channel (IKr). His interests also include chiral separation of drugs and how this affects drug action and the role of the nervous system in facilitating cardiac arrhythmias.

Dr. Chunxiang (Kevin) Zhang, is the chair of the Department of Pharmacology. Dr. Zhang has 20 years of experience and expertise in basic, clinical and translational research in the area of cardiovascular diseases. The primary focus is the biological roles of microRNAs in cardiovascular diseases.



Rush University Course Descriptions

Rush University Course Descriptions

Courses are listed alphabetically by course prefix (not by discipline).

ANA	Anatomy and Cell Biology
BCH	Biochemistry
BHV	Behavioral Science
BMC	Biomechanics
BTN	Biotechnology
CDS	Communication Disorders and Sciences
CHS	College of Health Sciences Interdisciplinary Courses
CLM	Clinical Lab Management
CLS	Clinical Laboratory Science
CRE	Clinical Research
DRM	Dermatology
EMD	Emergency Medicine
FAM	Family Medicine
GCC	Graduate College Core
HHV	Religion, Health and Human Values
HSC	Health Sciences
HSM	Health Systems Management
IMM	Immunology
IS	Imaging Sciences
MED	Internal Medicine
MIC	Microbiology
MLS	Medical Laboratory Science
MPH	Medical Physics
NEU	Neuroscience
NFA	Nurse First Assistant
NGT	Nursing Transition Course
NRS	Nursing
NSG	Nursing Graduate
NTR	Clinical Nutrition
NUR	Nursing Core Classes
OBG	Obstetrics and Gynecology
OCC	Occupational Therapy
PAS	Physician Assistant Studies
PED	Pediatrics
PHR	Pharmacology

PHY	Biophysics/Physiology
PMR	Phys Med and Rehab
PRF	Perfusion Technology
PSY	Psychiatry
PTH	Pathology
PVM	Preventive Medicine
RAD	Radiology
RC	Respiratory Care
RMC	Rush Medical College
RMD	Rush Medical College Multidisciplinary Course
RSA	Research Administration
SBB	Specialist in Blood Bank
SUR	Surgery
VAS	Vascular Ultrasound

Discipline Abbreviations

Courses listed and described in this section have been approved by the several faculties of Rush University. The courses are listed alphabetically according to the discipline to which the course content is most closely related. These disciplines do not necessarily reflect a department in the University or in the Medical Center. An abbreviation for the discipline precedes the course number for each course listed.

Course Numbers

A three-digit course number follows the course abbreviation. It indicates the level of offering for that course as shown below:

Course Numbering System (Effective 2007)

300-399	Upper-level undergraduate courses
400-499	Upper-level undergraduate courses
500-599	Graduate-level courses
600-699	Doctoral-level courses
700-799	Rush Medical College clinical rotations
800-899	Rush Medical College clinical electives at John H. Stroger, Jr. Hospital of Cook County and also used by other university programs for externships
900	Independent Study
999	Continuous Enrollment

Course Content

A course title is followed by a brief description of course content and information pertaining to the course.

Course Prerequisites or Corequisites

Specific prerequisites are noted for some courses. Where no prerequisite is listed, it is assumed that students enrolling will have an adequate background. Students who have any questions about preparation should consult with the instructor of the course. If a corequisite is listed, that course must be taken either during the same term or prior to the course which has a corequisite.

Course Credit

The number of credit hours for a course appears between parentheses. Rush Medical College courses will display "NA" since course credit hours are not assigned.

Independent Study Courses

Students may enroll in an independent study course in any discipline of the University under the direction of appropriate faculty with his or her written permission and the approval of the program director. The course number 900 will be used for independent study with the appropriate discipline prefix.

ANA-500 Introduction to Neurobiology

The development, morphology, and functional significance of the human nervous system are presented in lecture and by demonstrations. Fixed human brain preparations and series of neurological slides are used as visual aid materials. Prerequisite: courses in human biology or anatomy and physiology or comparative anatomy, and permission of instructor.
3.00-4.00, Classroom | Web Component

ANA-500 Introduction to Neurobiology

The development, morphology, and functional significance of the human nervous system are presented in lecture and by demonstrations. Fixed human brain preparations and series of neurological slides are used as visual aid materials. Prerequisite: courses in human biology or anatomy and physiology or comparative anatomy, and permission of instructor.
3.00, Classroom

ANA-501 Medical Histology

The microscopic anatomy of cells, tissues, and organ systems of the human body is studied through laboratories, lectures, and self-instructional material. Fine structural specializations relating to tissue function are emphasized along with the histological architecture that characterizes each.
1.00, Class & Lab | Web Component

ANA-501E Medical Histology - Exam Makeup

Medical Histology examination make-up only.
1.00, RMC Exam Makeup

ANA-502 Medical Human Anatomy I

The structure and function of the human body are examined topographically through laboratory dissection, lectures, and preceptuals. Laboratory dissection is conducted regionally, encompassing the thorax, abdomen, pelvis, perineum, head and neck, back, and extremities. Radiological anatomy, living anatomy, and clinical correlations are emphasized. The course also provides a survey of embryology and organ-system development.
1.00, Class & Lab | Web Component

ANA-502E Medical Human Anatomy I - Exam Makeup

Medical Human Anatomy I exam makeup only.
1.00, RMC Exam Makeup

ANA-503 Human Anatomy II

Continuation of ANA 502. Embryology is introduced where pertinent.
1.00, Class & Lab | Web Component

ANA-503E Medical Human Anatomy II-Exam Makeup

Medical Human Anatomy II exam makeup only.
1.00, RMC Exam Makeup

ANA-511 Graduate Histology

The microscopic anatomy of cells, tissues, and organ systems of the human body is studied through laboratories, lectures, and self-instructional material. Fine structural specializations relating to tissue function are emphasized along with the histological architecture that characterizes each. This course designation for graduate students includes additional discussion, microscopic slide work, and exam components adapted for graduate study.
4.00, Class & Lab

ANA-511 Graduate Histology

The microscopic anatomy of cells, tissues, and organ systems of the human body is studied through laboratories, lectures, and self-instructional material. Fine structural specializations relating to tissue function are emphasized along with the histological architecture that characterizes each. This course designation for graduate students includes additional discussion, microscopic slide work, and exam components adapted for graduate study.
3.00, Class & Lab

ANA-512 Graduate Neurobiology

This course designation for graduate students includes discussion and additional readings for graduate students, and exam components adapted for graduate study. An integrated

approach to the central and peripheral nervous system is presented from an anatomic, physiologic and neurochemical standpoint. Based on neuroanatomy, major systems are developed and discussed in terms of anatomic arrangement, physiologic functioning and related synaptic pharmacology. In all systems clinical lectures highlight the practical applications of basic science concepts in patient evaluation and management.

8.00, Classroom | Web Component

ANA-513 Graduate Human Anatomy I

The structure and function of the human body are examined topographically through laboratory dissection, lectures, and preceptorials. Laboratory dissection is conducted regionally, encompassing the thorax, abdomen, pelvis, perineum, head and neck, back, and extremities. Radiological anatomy, living anatomy, and clinical correlations are emphasized. The course also provides a survey of embryology and organ-system development. This course designation for graduate students includes additional discussion, dissection, and exam components adapted for graduate study.

8.00, Class & Lab | Web Component

ANA-513 Graduate Human Anatomy I

The structure and function of the human body are examined topographically through laboratory dissection, lectures, and preceptorials. Laboratory dissection is conducted regionally, encompassing the thorax, abdomen, pelvis, perineum, head and neck, back, and extremities. Radiological anatomy, living anatomy, and clinical correlations are emphasized. The course also provides a survey of embryology and organ-system development. This course designation for graduate students includes additional discussion, dissection, and exam components adapted for graduate study.

5.00, Class & Lab

ANA-514 Graduate Human Anatomy II

Continuation of ANA 513. Embryology is introduced where pertinent. This course designation for graduate students includes additional discussion, dissection, and exam components adapted for graduate study.

8.00, Classroom

ANA-514 Graduate Human Anatomy II

Continuation of ANA 513. Embryology is introduced where pertinent. This course designation for graduate students includes additional discussion, dissection, and exam components adapted for graduate study.

5.00, Classroom

ANA-581 Research Methods in Anatomy

Discussion, demonstrations, and directed laboratory work provide exposure to general histological techniques as well as introduction to selected methods adopted by the student's research advisor.

4.00, Classroom

ANA-581 Research Methods in Anatomy

Discussion, demonstrations, and directed laboratory work provide exposure to general histological techniques as well as introduction to selected methods adopted by the student's research advisor.

3.00, Classroom

ANA-589 Proseminar in Skeletal Biology

Proseminars offered on topics of skeletal biology by faculty or visiting faculty. Provide knowledge on background of the following topics in skeletal biology; molecular biology, cell biology, biomechanics, biomaterials, and diseases in musculoskeletal tissue.

1.00, Classroom

ANA-590 Special Topics in Anatomy

Exploration of literature dealing with cell and molecular mechanisms and topics related to ongoing research in the department. A paper is generally required that can serve as the basis for background literature review for development of thesis/dissertation documents. Consult program director.

2.00, Classroom

ANA-590 Special Topics in Anatomy

Exploration of literature dealing with cell and molecular mechanisms and topics related to ongoing research in the department. A paper is generally required that can serve as the basis for background literature review for development of thesis/dissertation documents. Consult program director.

1.00, Classroom

ANA-591 Teaching Assistantship

Provides a directed experience in instruction and presentation techniques. Prerequisite: Consult program director.

1.00-4.00, Classroom

ANA-595 Journal Club

Discussion and presentation of both historical and current journal articles. Often the articles are chosen to correspond to the topics being covered in the other anatomy and cell biology classes.

1.00-3.00, Classroom

ANA-599 Master's Thesis Research

Laboratory research project and preparation of the master's thesis. A letter grade is provided for this course.

1.00-12.00, Laboratory

ANA-599 Master's Thesis Research

Laboratory research project and preparation of the master's thesis. A letter grade is provided for this course.

1.00-9.00, Laboratory

ANA-699 Research

Research devoted to the preparation of a dissertation in partial fulfillment of the requirements of the degree program. Prerequisite: permission of program director. This is a pass/no pass course.

1.00-12.00, Laboratory

ANA-699 Doctoral Research

Research devoted to the preparation of a dissertation in partial fulfillment of the requirements of the degree program. Prerequisite: permission of program director. This is a pass/no pass course.

1.00-9.00, Laboratory

ANA-781 Research in Anatomy

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Director of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Clinical Curriculum.

4.00, Classroom

ANA-791 Surgical Anatomy

A laboratory program of special dissections and demonstrations. The applied, clinical, and surgical aspects of anatomical regions are emphasized

2.00-4.00, Clinical

ANA-793 Advanced Histology/Cell Biology

The program will focus on in-depth study of histology/cell biology of regions designated by the participant and agreed upon by the course director. The program will incorporate didactic material with special emphasis on independent study and presentations on topics of interest at the forefront of the designated field.

2.00, Clinical

ANA-7EI Basic Science Individualized Elective

Students may receive credit for an individually arranged elective with a Rush faculty member. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements. Elective

4.00, Classroom

ANA-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study

ANA-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

BCH-501 Biochemistry I

Biochemistry of biologically important compounds and molecular biology for medical students. DNA, RNA, structure, replication, transcription, translation, protein structure, protein modifications, hemoglobin, immunoglobulin, sickle cell anemia, fibrillar proteins, enzymology and kinetics, enzyme regulation, blood clotting, membranes, membrane proteins, hormones, gene regulation, recombinant DNA, cystic fibrosis, transgenic animals, oncogenes, chemotherapeutic agents, small group clinical case studies on hepatitis, fragile X, DNA repair and pertussis. Multiple choice tests.

1.00, Classroom | Web Component

BCH-502 Biochemistry II

Biochemistry of intermediary metabolism and nutrition for medical students. Bioenergetics, redox reactions, Krebs cycle, carbohydrate metabolism, glycolysis, gluconeogenesis, pentose phosphate pathway, glycoproteins, osteoarthritis, lipid metabolism, synthesis and degradation, special lipids, cholesterol, coronary heart disease, amino acid metabolism, urea cycle, bioactive amino acid products, glutathione, amino acid disorders, nucleotide metabolism and disorders, biotransformations, nutrition, small group clinical case studies pancreatic insufficiency, Gaucher disease, diabetes, urea cycle disorders. Multiple choice tests.

1.00, Classroom | Web Component

BCH-571 Medical Biochemistry for Graduate Students

Medical Biochemistry for graduate students. Graduate students take same lecture classes as medical students (BCH 501, 502). Instead of classes devoted to clinical studies or case studies in small group discussions, the graduate students receive supplemental lectures focused on experimental techniques, experimental design and biochemical calculations, pH and buffers, bioenergetics and redox chemistry, proteomics, carbohydrate chemistry, lipids, hormone receptors, signaling, and protein turnover. Essay examinations.

5.00, Classroom | Web Component

BCH-571 Medical Biochemistry for Graduate Students

Medical Biochemistry for graduate students. Graduate students take same lecture classes as medical students (BCH 501, 502). Instead of classes devoted to clinical studies or case studies in small group discussions, the graduate students receive supplemental lectures focused on experimental techniques, experimental design and biochemical calculations, pH and buffers, bioenergetics and redox chemistry, proteomics, carbohydrate chemistry, lipids, hormone receptors, signaling, and protein turnover. Essay examinations.

3.00, Classroom | Web Component

BCH-572 Medical Biochemistry-Graduate Students II

Medical Biochemistry for graduate students. Graduate students take same lecture classes as medical students (BCH 501, 502). Instead of classes devoted to clinical studies or case studies in small group discussions, the graduate students receive supplemental lectures focused on experimental techniques, experimental design and biochemical calculations, pH and buffers, bioenergetics and redox chemistry, proteomics, carbohydrate chemistry, lipids, hormone receptors, signaling, and protein turnover. Essay examinations.

5.00, Classroom | Web Component

BCH-581 Biochemical Methodology I

Graduate students complete a laboratory rotation in one faculty member's laboratory for the whole quarter. They learn several research techniques, experimental design, data collection and analysis. Research projects are related to ongoing efforts in the laboratory. Students complete a written laboratory report at the end of the quarter and also give an oral presentation of their work.

4.00, Classroom | Web Component

BCH-581 Biochemical Methodology I

Graduate students complete a laboratory rotation in one faculty member's laboratory for the whole term. They learn several research techniques, experimental design, data collection and analysis. Research projects are related to ongoing efforts in the laboratory. Students complete a written laboratory report at the end of the term and also give an oral presentation of their work.

3.00, Laboratory | Web Component

BCH-582 Biochemical Methodology II

Graduate students complete a second laboratory rotation in a different laboratory. This laboratory experience is meant to complement the first quarter rotation and learn a new set of research techniques.

4.00, Classroom

BCH-582 Biochemical Methodology II

Graduate students complete a second laboratory rotation in a different laboratory. This laboratory experience is meant to complement the first quarter rotation and learn a new set of research techniques.

3.00, Classroom

BCH-585 Extramural Research

An eight to ten week experience at an industrial research laboratory or a different academic laboratory in Europe or the United States. Student will focus on major and minor research areas. Assigned reading, a final examination and a written report are required.

1.00-10.00, Classroom

BCH-595 Journal Club

Discussion and presentation of both historical and current journal articles. Often the articles are chosen to correspond to the topics being covered in the other biochemistry classes.
2.00, Classroom | Web Component

BCH-595 Journal Club

Discussion and presentation of both historical and current journal articles. Often the articles are chosen to correspond to the topics being covered in the other biochemistry classes.
1.00, Classroom | Web Component

BCH-598 Biochemistry Master's Research

Biochemistry thesis research for master's students.
1.00-12.00, Laboratory

BCH-598 Master's Thesis Research-Biochemistry

Biochemistry thesis research for master's students.
1.00-9.00, Laboratory

BCH-624 Connective Tissue Biochemistry

Biochemistry of the extracellular matrix in connective tissues. Topics include collagen genes, structure, types, biosynthesis and diseases; proteoglycan structure, synthesis and diseases, hyaluronan; calcification of connective tissues, bone morphogenic proteins, basement membranes, elastin, fibronectin, extracellular matrix receptors, matrix metalloproteinases, and matrix metalloproteinase gene regulation.
3.00, Classroom | Web Component

BCH-624 Connective Tissue Biochemistry

Biochemistry of the extracellular matrix in connective tissues. Topics include collagen genes, structure, types, biosynthesis and diseases; proteoglycan structure, synthesis and diseases, hyaluronan; calcification of connective tissues, bone morphogenic proteins, basement membranes, elastin, fibronectin, extracellular matrix receptors, matrix metalloproteinases, and matrix metalloproteinase gene regulation.
2.00, Classroom | Web Component

BCH-698 Introduction to Research

Each faculty member in the department of biochemistry discusses the research performed in their laboratory with the first year graduate students.
1.00, Laboratory

BCH-699 Biochemistry Doctoral Research

Biochemistry dissertation research for doctoral students.
(P/N only)
1.00-12.00, Laboratory | Web Component

BCH-699 Doctoral Research - Biochemistry

Biochemistry dissertation research for doctoral students.
(P/N only)
1.00-9.00, Laboratory

BCH-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.
1.00-12.00, Independent Study

BCH-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
1.00, Continuous Enrollment

BHV-751 Sleep Disorders

Diagnosis and treatment of sleep and arousal disorders as recognized by the Association of Sleep Disorders Centers. Major diagnostic categories are reviewed in terms of clinical presentation, etiology, laboratory findings, and potential therapies. Students sit in with outpatients, interview in-patient consults, and review sleep studies. Prerequisite: approval of course director.
2.00-4.00, Clinical

BHV-781 Research in Psychology/Behavioral Science

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year.
4.00, Clinical

BMC-501 Statics & Dynamics

Introduction to statics and dynamics including general principles of mechanics and standard procedures for solving problems. Force vectors, free body diagram construction, moments, equilibrium, and friction concepts are covered in the statics portion of

the course. Equations of motion, energy and momentum principles, rigid body movement concepts are covered in the dynamics portion of the course.

4.00, Classroom | Web Component

BMC-501 Statics & Dynamics

Introduction to statics and dynamics including general principles of mechanics and standard procedures for solving problems. Force vectors, free body diagram construction, moments, equilibrium, and friction concepts are covered in the statics portion of the course. Equations of motion, energy and momentum principles, rigid body movement concepts are covered in the dynamics portion of the course.

3.00, Classroom | Web Component

BMC-502 Strength & Properties of Materials

Axially loaded members, torsion of circular and non circular members, stress and strain and their relationships including three dimensions, combined loadings, components with pressure, moment of inertia, symmetrical and unsymmetrical bending.

4.00, Classroom | Web Component

BMC-502 Strength & Properties of Materials

Axially loaded members, torsion of circular and non circular members, stress and strain and their relationships including three dimensions, combined loadings, components with pressure, moment of inertia, symmetrical and unsymmetrical bending.

3.00, Classroom | Web Component

BMC-503 Introduction to Research

Introduces students to methods of scientific research to include review of literature, research designs, sampling techniques, measurement, and related issues. Research articles and research thesis that exemplify various research designs, presentation of results, and conclusions will be reviewed and discussed.

1.00, Classroom

BMC-505 Gross Anatomy Musculoskeletal System

This 4 and ½ week course is entitled Gross Anatomy of the Musculoskeletal System. This course is a laboratory-driven survey of the musculoskeletal system which also includes lecture components. Beyond an understanding of the normal structure and function of this system, students will study the development of the musculoskeletal system as well as the changes noted in maturation and ageing processes within this system. The basic knowledge of the structure and function of the components of the musculoskeletal system will then be applied to the abnormal functions that are the basis for disorders and diseases of this system. The overall course objectives below were developed by the faculty and represent the content of this course. Individual

learning objectives for each lecture as well as for the lab are contained within the educational materials for these sessions. (1) Describe the embryologic development of musculoskeletal structures. (2) Describe the structure, function/s and control of the musculoskeletal system in normal movement and posture. (3) Describe the organization of the nervous System at the gross anatomic, tissue and cellular level. (4) Apply your understanding of the anatomic basis of musculoskeletal abnormalities to specific clinical scenarios.

4.00, Classroom | Web Component

BMC-505 Gross Anatomy Musculoskeletal System

This course is a laboratory-driven survey of the musculoskeletal system which also includes lecture components. Beyond an understanding of the normal structure and function of this system, students will study the development of the musculoskeletal system as well as the changes noted in maturation and ageing processes within this system. The basic knowledge of the structure and function of the components of the musculoskeletal system will then be applied to the abnormal functions that are the basis for disorders and diseases of this system. The overall course objectives below were developed by the faculty and represent the content of this course. Individual learning objectives for each lecture as well as for the lab are contained within the educational materials for these sessions. (1) Describe the embryologic development of musculoskeletal structures. (2) Describe the structure, function/s and control of the musculoskeletal system in normal movement and posture. (3) Describe the organization of the nervous system at the gross anatomic, tissue and cellular level. (4) Apply your understanding of the anatomic basis of musculoskeletal abnormalities to specific clinical scenarios.

3.00, Classroom | Web Component

BMC-511 Biomechanics

Application of mechanics principles to the study of the human body. Primary focus on musculoskeletal biomechanics: study of forces and their interaction with joints, bone, cartilage and tendon tissue. Background in mechanical engineering, including statics, dynamics, and strength of materials is advantageous.

4.00, Classroom | Web Component

BMC-511 Biomechanics

Application of mechanics principles to the study of the human body. Primary focus on musculoskeletal biomechanics: study of forces and their interaction with joints, bone, cartilage and tendon tissue. Background in mechanical engineering, including statics, dynamics, and strength of materials is advantageous.

3.00, Classroom | Web Component

BMC-512 Bioengineering Materials

A comprehensive introduction to biomaterials used in implants and medical devices with an emphasis on orthopedic biomaterials and preparation for working in the implant industry. This course reviews the properties, clinical significance, and regulatory implications of materials and devices relevant to their application to the human body. It covers metals, ceramics, polymers, composites, natural biomaterials, soft and hard tissue implants and implant failure case studies. The fundamentals of implant material biocompatibility and federal regulations are also covered.

4.00, Classroom

BMC-512 Bioengineering Materials

A comprehensive introduction to biomaterials used in implants and medical devices with an emphasis on orthopedic biomaterials and preparation for working in the implant industry. This course reviews the properties, clinical significance, and regulatory implications of materials and devices relevant to their application to the human body. It covers metals, ceramics, polymers, composites, natural biomaterials, soft and hard tissue implants and implant failure case studies. The fundamentals of implant material biocompatibility and federal regulations are also covered.

3.00, Classroom

BMC-513 Kinematics of Human Motion

Introduces students to the fundamentals of motion analysis measurement, research, and clinical applications. After a survey of current and historical motion analysis systems and techniques, students will learn methodology and interpretation of motions accelerations and forces produced by, or applied to body segments during daily activities. Focus will be on the lower extremities but spine and upper body will be introduced as well. Students will also gain familiarity with complementary measurement tools such as electromyography.

4.00, Classroom

BMC-513 Kinematics of Human Motion

Introduces students to the fundamentals of motion analysis measurement, research, and clinical applications. After a survey of current and historical motion analysis systems and techniques, students will learn methodology and interpretation of motions accelerations and forces produced by, or applied to body segments during daily activities. Focus will be on the lower extremities but spine and upper body will be introduced as well. Students will also gain familiarity with complementary measurement tools such as electromyography.

3.00, Classroom | Web Component

BMC-514 Spine Biomechanics

Study of the effects of spine conditions, surgical techniques and implants on the function, motion and stability of the spine. In vitro, in silico and in vivo analyses of spinal kinematics and dynamics as well as the corresponding experimental methods used. Spinal tissue mechanical properties and function characterization will also be covered.

4.00, Classroom

BMC-514 Spine Biomechanics

Study of the effects of spine conditions, surgical techniques and implants on the function, motion and stability of the spine. In vitro, in silico and in vivo analyses of spinal kinematics and dynamics as well as the corresponding experimental methods used. Spinal tissue mechanical properties and function characterization will also be covered.

3.00, Classroom

BMC-521 Thesis Project

Students must choose an area of concentration in order to complete the thesis requirements of the degree program. The overall aim of the thesis is to make the students work on a clinically relevant topic in the following musculoskeletal biomechanics categories: Human Motion, Implant Design and Analyses, Spine Biomechanics, Bone Mechanics, Cartilage Mechanics, Biomechanics and Biochemical Analyses of Ligaments, Tendons and Muscles. [variable hours, minimum 29 quarter hours]

1.00-12.00, Classroom

BMC-521 Master's Thesis Research

Students must choose an area of concentration in order to complete the thesis requirements of the degree program. The overall aim of the thesis is to make the students work on a clinically relevant topic in the following musculoskeletal biomechanics categories: Human Motion, Implant Design and Analyses, Spine Biomechanics, Bone Mechanics, Cartilage Mechanics, Biomechanics and Biochemical Analyses of Ligaments, Tendons and Muscles. [variable hours, minimum 29 quarter hours]

1.00-9.00, Classroom

BMC-611 Non-Linear Tissue for BMC

Covers viscoelasticity and advanced biomechanics of skeletal tissues, with a focus on soft orthopedic tissues (e.g., cartilage, tendon, and ligament). Topics include tissue composition and structure, establishment of basic governing mechanical principles and constitutive relations for tissues, and nonlinear models of fibrillar and viscoelastic porous matrices. Experimental determination of various tissue properties will be introduced and demonstrated.

3.00, Classroom

BMC-612 Advanced Strength of Materials

Principal stresses and strains, relationship between stress and strain, bending of straight and curved bars, composite beams in bending and torsion, thin rods under complex loading, instantaneous center of rotation, mechanical design considerations.

3.00, Classroom

BMC-613 Implant Biomechanics

Provides students a basic understanding on the design of artificial human joints, in particular, knee, hip and spine. Material and mechanical considerations of joint replacement will be addressed. Topics include forces and moments at human joints, stress analysis of implant, manufacture of implants and standards, control and approval.

3.00, Classroom

BMC-614 Bone Biology

Designed to give a graduate level overview of bone biology. Topics to be covered include material compositions, structure (bone architecture), tissue biomechanics, cells and turnover, mineralization, growth and development, serum calcium homeostasis, bone as an endocrine organ, laboratory and clinical imaging strategies, and metabolic bone diseases including osteoporosis.

3.00, Classroom | Web Component

BMC-615 Advanced Biomaterials

Focuses on current issues of implant materials science and biological principles that impact the design of implants and tissue-engineered products. Topics addressed include structural hierarchies of materials and tissues, physical and chemical properties of surfaces, degradation of materials, federal regulatory issues and advanced biocompatibility and implant immunology encompassing cell-surface/cell/matrix interactions. The course also covers normal and excessive inflammatory, immunological, and pathological events associated with implant biomaterials with a focus on orthopedic biomaterials and fundamental required for working in the orthopedics industry. Prerequisites: BMC 501 Statics and Dynamics, BMC 502 Strength and Properties of Materials and BMC 512 Bioengineering Materials.

3.00, Classroom

BMC-616 Tribology of Implants

Introduces the system aspects of tribology. Regardless of the tribological system, friction and wear are based on certain combinations of acting mechanisms, which depend on the structure of the system as well as on the introduction of tribological stresses. The major mechanisms of friction and wear under solid contact conditions will be highlighted and related to basic physical, mechanical and chemical properties of the surfaces.

3.00, Classroom

BMC-631 Doctoral Research in Biomechanics

Biomechanics dissertation research for doctoral students. (variable)

1.00-9.00, Laboratory

BMC-699 Elective: Recent Advances in Orthopedics

New, up-to-date developments in gait analysis, spine kinematics, and modeling of human joints.

3.00, Classroom

BTN-521 Models in Research

This is a journal club which requires the student to critically evaluate published work.

2.00, Classroom | Web Component

BTN-521 Experimental Models in Disease

This is a journal club which requires the student to critically evaluate published work

2.00, Classroom | Web Component

BTN-522 Introduction to Experimental Design

Research problems, posed by the faculty, will be understood, developed and solved by students in a cooperative, interactive application of computer and library resources.

2.00, Classroom | Web Component

BTN-523 Tools for Research

Application of computer, digital imaging and other supporting technologies are presented and practiced.

2.00, Classroom | Web Component

BTN-523 Tools for Research

Application of computer, digital imaging and other supporting technologies are presented and practiced.

1.00, Classroom | Web Component

BTN-524 Communication & Lab Management

All aspects of seeking and obtaining the career start with employment are covered. Laboratory management is introduced.

1.00, Classroom | Web Component

BTN-524 Communication & Lab Management

All aspects of seeking and obtaining the career start with employment are covered. Laboratory management is introduced.

2.00, Classroom | Web Component

BTN-525 Experimental Models in Disease & Experimental Design

This course will study the role of experimental models in research. The various aspects of experimental models, computer (in silico) to animal models, will be discussed building

on principles of experimental design. This course requires the student to critically evaluate published work and develop their model for a given disease. Research problems posed by faculty will be understood, developed and solved by students in a cooperative, interactive application of computer and library resources.

2.00, Classroom | Web Component

BTN-531 Laboratory Techniques I

This series of laboratory courses provides direct experience in the major laboratory methods and techniques commonly used in the modern research laboratory. The objective of this series is to prepare the student for direct entry into biomedical research and development in industry or in an academic setting.

3.00, Laboratory | Web Component

BTN-531 Laboratory Techniques I

Introduction to laboratory techniques, basic techniques with proteins and cells, laboratory safety training and Good Laboratory practices training with qualifying examination.

2.00, Classroom | Laboratory | Web Component

BTN-532 Laboratory Techniques II

Cell isolation and cell culture techniques; experimentation with cell cultures; cell cycle, survival, protein and DNA content determination.

2.00, Classroom | Laboratory | Web Component

BTN-533 Laboratory Techniques III

Basic and extended molecular biology techniques; DNA and RNA work, cloning and protein expression techniques.

2.00, Laboratory | Web Component

BTN-534 Laboratory Techniques IV

Animal husbandry, experimental procedures and techniques.

2.00, Laboratory | Web Component

BTN-535 Laboratory Techniques V

Modern techniques in sample analyses. Protein sample preparation and analysis by HPLC, 2-D electrophoresis, IEF, mass spec. Introduction to proteomics.

2.00, Laboratory | Web Component

BTN-536 Laboratory Techniquet VI

Histology and immunohistochemistry techniques.

2.00, Laboratory | Web Component

BTN-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for

continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

CDS-501 Audiologist Methods for Speech-Language Pathologists

This course introduces methods for basic audiologic assessment of adults and children for use by speech-language pathologists.

1.00, Classroom | Web Component

CDS-503 Hearing Screen/Service Delivery for Speech-Language Pathologists

This course reviews the anatomy and physiology of hearing and the basics of hearing science. Types of hearing loss, forms of hearing assessment, and principles of intervention and rehabilitation are presented as foundations for practicing speech-language pathologists. Skills related to participating in assessment and intervention are developed through laboratory activities.

2.00, Classroom

CDS-504 Speech Production/Speech Perception

This course addresses the physiology of speech production, the acoustic characteristics of speech, the relationship between articulation and acoustics, and processes by which listeners perceive speech. Theories of speech production and perception will be discussed. The life span issues related to speech, dialectal and/or cultural characteristics of normal speech and the acoustic and perceptual characteristics of abnormal speech are also addressed. The course includes lectures, class discussions, and laboratory work.

4.00, Classroom | Web Component

CDS-505 Clinical Methods Speech-Language Pathology I

This course emphasizes basic clinical methods and skills for beginning graduate students in speech-language pathology with an emphasis on assessment. Topic areas include Rush note-writing and documentation. Students will practice administering, scoring, and interpreting common standardized tests.

2.00, Classroom | Web Component

CDS-506 Clinical Methods Speech-Language Pathology II

This course emphasizes more advanced clinical methods and skills for beginning graduate students in speech-language pathology with an emphasis on intervention. Topic areas include Rush clinical protocols and operational procedures.

2.00, Classroom | Web Component

CDS-507 Neurological Bases Speech/Hearing/Language

Central and peripheral nervous system structures that form the neurologic foundation for speech, hearing, and language are presented.

4.00, Classroom | Web Component

CDS-510 Professional Issues-Speech-Language Pathology

This course provides an overview of professional issues for speech-language pathologists. Topics include regulatory, licensure and scope of practice issues, professional ethics, healthcare reimbursement, risk management and legal issues, and other current professional areas.

2.00, Classroom | Web Component

CDS-511P Speech-Language Practicum I

Supervised clinical experience with patients presenting speech, language, voice, fluency, or swallowing impairments. Students develop evaluative, therapeutic, counseling, and report-writing skills. Relationship of speech-language pathology to other health care professions is examined. Experience includes patients across the lifespan and from diverse cultural backgrounds.

2.00-3.00, Classroom | Practicum | Web Component

CDS-512 Speech-Language Practicum II

Supervised clinical experience with patients presenting speech, language, voice, fluency, or swallowing impairments. Students develop evaluative, therapeutic, counseling, and report-writing skills. Relationship of speech-language pathology to other health care professions is examined. Experience includes patients across the lifespan and from diverse cultural backgrounds.

2.00-3.00, Practicum | Web Component

CDS-512P Speech-Language Practicum II

Supervised clinical experience with patients presenting speech, language, voice, fluency, or swallowing impairments. Students develop evaluative, therapeutic, counseling, and report-writing skills. Relationship of speech-language pathology to other health care professions is examined. Experience includes patients across the lifespan and from diverse cultural backgrounds.

2.00-3.00, Practicum | Web Component

CDS-513P Speech-Language Practicum III

Supervised clinical experience with patients presenting speech, language, voice, fluency, or swallowing impairments. Students develop evaluative, therapeutic, counseling, and report-writing skills. Relationship of speech-language pathology to other

health care professions is examined. Experience includes patients across the lifespan and from diverse cultural backgrounds.

4.00, Practicum | Web Component

CDS-513P Speech-Language Pathology Practicum III

Supervised clinical experience with patients presenting speech, language, voice, fluency, or swallowing impairments. Students develop evaluative, therapeutic, counseling, and report-writing skills. Relationship of speech-language pathology to other health care professions is examined. Experience includes patients across the lifespan and from diverse cultural backgrounds.

4.00-6.00, Practicum | Web Component

CDS-514P Speech-Language Practicum IV

Supervised clinical experience with patients presenting speech, language, voice, fluency, or swallowing impairments. Students develop evaluative, therapeutic, counseling, and report-writing skills. Relationship of speech-language pathology to other health care professions is examined. Experience includes patients across the lifespan and from diverse cultural backgrounds.

4.00, Practicum | Web Component

CDS-521 Language Disorders: Preschool Child

Language development and disorders of preschool children including primary and secondary disorders. Underlying constructs and clinical markers, assessment, and intervention strategies. Prerequisite: completion of undergraduate course in normal speech and language development.

4.00, Classroom | Web Component

CDS-522 Language Disorders: School Age Child

Language development and disorders in spoken and written language of school age children and adolescents, including both primary and secondary language disorders. Underlying constructs and clinical markers leading to differential diagnosis. Assessment and intervention strategies are examined.

4.00, Classroom | Web Component

CDS-524 Fluency Dysfluency/Stuttering

This course addresses child and adult fluency disorders. Current research findings on stuttering will be discussed. Students learn to describe pertinent characteristics of speech fluency, identify the presence of a clinically significant fluency problem, and determine etiologic and maintaining factors. Differential diagnosis of neurogenic and psychogenic stuttering will also be discussed. Appropriate management strategies are considered.

2.00, Classroom | Web Component

CDS-526 Articulation/Phonological Disorders

Development and disorders of articulation and phonology in pediatric populations. Topics include research-based typologies including childhood apraxia of speech. Assessment skills are developed. Theories and procedures of contemporary interventions are presented.

4.00, Classroom | Web Component

CDS-526 Speech Sound Disorders

Development and disorders of articulation and phonology in pediatric populations. Topics include research-based typologies including childhood apraxia of speech. Assessment skills are developed. Theories and procedures of contemporary interventions are presented.

4.00, Classroom | Web Component

CDS-528 Current Issues in Augmentative and Alternative Communication Aids Service Delivery

This short term, intensive course serves as an introduction to current methods and basic strategies associated with the use of augmentative and alternative communication aids and approaches.

1.00, Classroom | Web Component

CDS-528 Current Issues in Augmentative and Alternative Communication Aids Service Delivery

This short term, intensive course serves as an introduction to current methods and basic strategies associated with the use of augmentative and alternative communication aids and approaches.

1.00, Classroom | Web Component

CDS-535 Clinical Issues: Cultural & Linguistic Diversity

This course surveys topics in cultural and linguistic diversity relevant to clinical practice in the profession of speech-language pathology. It is designed to provide graduate students with a solid foundation for clinical practice with children who speak a dialect or language other than, or in addition to, English.

2.00, Classroom | Web Component

CDS-537 Anatomy & Physiology of Speech System

This course reviews the anatomy and physiology of the speech systems of respiration, phonation, and articulation. A review of hearing anatomy and physiology is included. Development of the speech mechanism across the lifespan is discussed. A one-hour weekly laboratory experience complements didactic information

2.00, Classroom | Laboratory | Web Component

CDS-540 Speech-Pathology Management of Head/Neck Cancer Patients

This course covers assessment and management of speech, voice, and swallowing disorders resulting from treatment for head

and neck cancer. All forms of alaryngeal speech available to laryngectomized individuals are studied. The voice and speech changes expected with other head and neck surgeries/treatments are discussed. Swallowing evaluation/treatment specific to the head and neck population is included.

2.00, Classroom | Web Component

CDS-542 Speech-Language Management of Tracheostomized Ventilator Dependent Patients

This course covers the unique challenges of evaluation and treatment of speech, voice, and swallowing impairments demonstrated by patients requiring tracheostomy tube placement and/or ventilator support. Basic understanding of various tracheostomy tubes, one-way speaking valves, and ventilators/ventilator settings will be covered. Short and long term options for communication will be discussed. Swallowing evaluation for this specialized population will be covered in detail. A team approach to patient care will be stressed.

2.00, Classroom | Web Component

CDS-558 Dysphagia

Normal anatomy and physiology of swallowing, evaluation of disordered oropharyngeal swallowing, and treatment for swallowing disorders are studied. Topics include instrumental and non-instrumental examinations with special emphasis on videofluoroscopic swallow study procedures and analysis. Swallowing disorders in various populations across the age span are discussed.

4.00, Classroom | Web Component

CDS-562 Craniofacial Anomalies

This course reviews the embryology, anatomy, and physiology of normal and abnormal development of orofacial structures. The focus is on cleft-palate and craniofacial anomalies with associated syndromes. Surgical, dental, audiological, and feeding aspects are addressed. Speech, language and resonance evaluation and intervention strategies are discussed with a focus on current literature. The emphasis is on a multi-disciplinary approach to treatment through the craniofacial team. This course includes lectures, discussions, observation in the Rush Craniofacial clinic, class presentations and literature review papers.

2.00, Classroom | Web Component

CDS-563 Voice Disorders

This course examines the acoustic, perceptual, and physiological dimensions of normal and abnormal voice. Predisposing, precipitating, and perpetuating etiologic factors are considered. Skills for assessment, differential diagnosis, and management

of hyperfunctional, psychogenic, and organic voice disorders are developed.

4.00, Classroom | Web Component

CDS-564 Aphasia

Adult onset aphasia, apraxia of speech, and related language disorders are examined. Emphasis include theoretical foundations, pathophysiology, symptomatology, assessment and diagnosis, and clinical management. Theoretical models and past/current controversies are included. Prerequisite: CDS 507.

4.00, Classroom | Web Component

CDS-567 Dysarthria

This course will focus on the diagnosis and treatment of a group of speech disorders that affect either single or combined speech subsystems of respiration, phonation, resonance, articulation, and prosody. The speech disorders are caused by changes in speech musculature or its movement patterns due to central or peripheral nervous system damage. This course includes lectures, class discussions, laboratory work, hands-on class projects and literature review papers.

4.00, Classroom | Web Component

CDS-568 Cognition/Communicative Disorders

This course examines normal cognition and the effects of aging, dementia, agnosia, injury to the non-dominant cerebral hemisphere, and traumatic brain injury on communication. Assessment and management of communication disorders arising from these conditions are reviewed. Prerequisites: CDS 507, CDS 564.

4.00, Classroom | Web Component

CDS-575 Issues in Counseling

The major focus is on understanding the process of the helping relationship. Students will consider the impact of cultural and age-related issues, and they will develop skills and competencies needed to influence effectiveness as a communicator. Knowledge of selected counseling theory as it integrates into practice will be acquired.

2.00, Classroom | Web Component

CDS-581 Research Methods: Communications Disorders

The development of skills in understanding and critiquing research reports is emphasized. Principles and criteria for evaluating research, including statistical analyses, issues of validity, and evidenced-based practice are studied. Consideration is given to both group and single subject research designs. Prerequisite: completion of a course in statistics.

4.00, Classroom | Web Component

CDS-589 Advanced Practicum I

Students are placed at practicum sites at Rush or other facilities for an extended clinical experience.

6.00-9.00, Practicum

CDS-589P Advanced Practicum I

Students are placed at practicum sites at Rush or other facilities for an extended clinical experience.

6.00-9.00, Practicum | Web Component

CDS-590 Advanced Practicum II

Students are placed at practicum sites at Rush or other facilities for an extended clinical experience.

12.00-15.00, Practicum

CDS-590P Advanced Practicum II

Students are placed at practicum sites at Rush or other facilities for an extended clinical experience.

12.00-15.00, Practicum | Web Component

CDS-591 Applied Topics: Communications Disorders/ Science

Scientific, clinical, and professional issues in audiology and speech-language pathology are examined using a variety of formats that include guest speakers in student development sessions, clinical rounds, and journal club. Development of oral presentation skills as well as analytical and clinical problem-solving skills is emphasized. The course meets weekly during regular sessions of the fall, winter, and spring quarters, but students register only in the fall.

1.00, Classroom | Web Component

CDS-598 Thesis

Under the guidance and direction of a faculty member and committee, the student originates, proposes, and executes an experiment. These projects must reflect a high degree of scholarship.

1.00-6.00, Classroom | Web Component

CDS-601 Anatomy & Physiology-Auditory System

This course includes anatomy/physiology of the outer, middle and inner ear and central auditory pathways. Anatomy and physiology of the vestibular system and theories of hearing are included. An overview of the anatomy and physiology of structures related to speech production is presented.

4.00, Classroom | Web Component

CDS-601L Anatomy & Phys of Auditory System Lab

This laboratory course examines the structures important for hearing through various activities which may include cadavers, models, specimens, computer images, and slides. This course is

taken in conjunction with CDS-601, Anatomy and Physiology of the Auditory System.

1.00, Laboratory

CDS-603 Acoustics & Psychoacoustics

This course includes the basic principles underlying the acoustics, analysis, and perception of sound. Psychoacoustic principles, theories of hearing and their relationship to normal hearing are presented.

4.00, Classroom | Web Component

CDS-604 Acoustic Phonetics Speech Perception

This course examines the roles of major acoustic, phonetic, linguistic and cognitive factors in speech perception and considers relevant theoretical models. Cross-language and developmental aspects of speech perception are also examined.

2.00, Classroom | Web Component

CDS-605 Embryology/Genetics Auditory Systems

After reviewing basic biology, this course presents basic patterns of biological inheritance and basic human genetics terminology. Focus is on genetics and hearing loss, and topics include gene therapy and hearing loss, syndromic and nonsyndromic hearing loss and consideration of pharmacogenomics. The importance of genetic counseling, family history and beliefs, prevention and ethical/legal issues are discussed. Embryologic development of the auditory, vestibular and craniofacial systems is presented and related to auditory/speech/balance function following birth.

2.00, Classroom | Web Component

CDS-608 Pharmacology

The general principles of drug action related to hearing and balance function will be presented. Emphasis will be on activity, mode of action, side effects, toxicity and drug interactions relevant to the practice of audiology.

3.00, Classroom | Web Component

CDS-609 Clinical Observation-Audiology

Students learn to identify and apply key elements necessary for introduction to clinical practice including relevant policies and procedures, infection control, electronic medical records, ethics and multicultural issues. Students also observe diagnostic and rehabilitative audiologic and speech and language procedures with infants, children, adults and geriatrics in outpatient, inpatient and short-term care settings.

1.00, Classroom | Web Component

CDS-610 Professional Issues in Audiology

Like other professions, the professional practice of audiology involves a number of specialty and legal matters. Licensure and

credentialing, professional standards, multicultural issues, life-long learning, mentoring, harassment, reimbursement, coding, third party payment, government regulations, legislation and advocacy are among the issues discussed in this course.

3.00, Classroom | Web Component

CDS-610 Seminar in Career Topics

This course includes exploration, discussion and analysis of 21st Century professional issues facing audiologists. Topics will reflect current issues and may include career planning and development, credentialing, specialty certification and licensure, diversity and inclusion, scope of practice and the use of technology in the clinic.

2.00, Classroom | Web Component

CDS-610 Seminar in Current Professional Issues

This course includes exploration, discussion and analysis of 21st Century professional issues facing audiologists. Topics will reflect current issues and may include career planning and development, credentialing, specialty certification and licensure, diversity and inclusion, scope of practice and the use of technology in the clinic.

2.00, Classroom | Web Component

CDS-612 Practice Management

Various service delivery models and their characteristics are introduced in this course. Parameters associated with practice management include business plan development, private practice orientation, trends in healthcare, marketing, cost/benefit ratios, financial and accounting considerations and personnel issues.

2.00, Classroom | Web Component

CDS-612 Clinical Operations & Practice Management

Service delivery models including private practice, clinics, medical centers, non-profit agencies, industry, government and other settings are introduced. Issues associated with clinical operations and practice management include business plan development, private practice orientation, trends in healthcare, marketing, cost/benefit ratios, financial and accounting considerations. Personnel issues, conflict management and strategic planning are discussed.

3.00, Classroom | Web Component

CDS-612 Practice Management Across Settings

Service delivery models including private practice, clinics, medical centers, non-profit agencies, industry, government and other settings are introduced. Issues associated with clinical operations and practice management include business plan development,

private practice orientation, trends in healthcare, marketing, cost/benefit ratios, financial and accounting considerations. Personnel issues, conflict management and strategic planning are discussed.
3.00, Classroom

CDS-616 Audiology Practicum I

Students are involved in supervised clinical experience with patients of all ages displaying various hearing impairments. Practicum experiences focus on development of specific skills and competencies in the areas of clinical writing, diagnostic evaluation, obtaining case histories, counseling, and treatment techniques for patients from diverse cultural backgrounds. The relationship of audiology to other health care professions is also examined.
1.00, Practicum

CDS-616P Audiology Practicum I

Students are involved in supervised clinical experience with patients of all ages displaying various hearing impairments. Practicum experiences focus on development of specific skills and competencies in the areas of clinical writing, diagnostic evaluation, obtaining case histories, counseling, and treatment techniques for patients from diverse cultural backgrounds. The relationship of audiology to other health care professions is also examined. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.
1.00, Practicum | Web Component

CDS-617 Audiology Practicum II

Students are involved in supervised clinical experience with patients of all ages displaying various hearing impairments. Practicum experiences focus on development of specific skills and competencies in the areas of clinical writing, diagnostic evaluation, obtaining case histories, counseling, and treatment techniques for patients from diverse cultural backgrounds. The relationship of audiology to other health care professions is also examined.
3.00, Practicum

CDS-617P Practicum II

Students are involved in supervised clinical experience with patients of all ages displaying various hearing impairments. Practicum experiences focus on development of specific skills and competencies in the areas of clinical writing, diagnostic evaluation, obtaining case histories, counseling, and treatment techniques for patients from diverse cultural backgrounds. The relationship of audiology to other health care professions is also examined. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.
3.00, Practicum | Web Component

CDS-618P Audiology Practicum III

Students are involved in supervised clinical experience with patients of all ages displaying various hearing impairments. Practicum experiences focus on development of specific skills and competencies in the areas of clinical writing, diagnostic evaluation, obtaining case histories, counseling, and treatment techniques for patients from diverse cultural backgrounds. The relationship of audiology to other health care professions is also examined.
3.00, Practicum | Web Component

CDS-619P Audiology Practicum IV

Students are involved in supervised clinical experience with patients of all ages displaying various hearing impairments. Practicum experiences focus on development of specific skills and competencies in the areas of clinical writing, diagnostic evaluation, obtaining case histories, counseling, and treatment techniques for patients from diverse cultural backgrounds. The relationship of audiology to other health care professions is also examined.
3.00, Practicum | Web Component

CDS-626 Hearing Conservation

This course includes an introduction to the effects of noise on hearing, sound measurement, noise descriptors, testing and follow-up. Prevention, hearing conservation procedures and devices are presented. Federal, state and local regulations, workmen's compensation and litigation are also discussed.
3.00, Classroom | Web Component

CDS-627 Pathophysiology of Auditory System

Students discuss risk factors, symptoms and pathogenesis of various ear diseases and auditory system disorders. Audiologic assessment as well as medical/surgical treatments are explained. Students will also be introduced to concepts related to the origins or tinnitus, clinical assessment and treatment efficacy.
3.00, Classroom | Web Component

CDS-628 Audiologic Assessment

This course presents behavioral tests of the auditory system that provide a differential diagnosis of auditory function. This course is taken in conjunction with CDS-629 Clinical Methods in Audiology. Prerequisite: CDS-601.
4.00, Classroom | Web Component

CDS-628 Audiologic Assessment

This course presents assessment of auditory function including comprehensive behavioral testing and tests measuring otoacoustic emissions (OAEs). This course is taken in conjunction with CDS 629, Clinical Methods in Audiology.
4.00, Classroom

CDS-629 Clinical Methods in Audiology

This lab course teaches key clinical protocols, methods, procedures and audiologic assessment techniques necessary for clinical practicum experience. The course includes obtaining case histories, performing otoscopy, practice of standard audiometric techniques and lab exercises promoting skill development.

2.00, Class & Lab | Web Component

CDS-631 Amplification I

This course provides a brief history of amplification as well as a discussion of the variety of hearing aids available. Topics include determining candidacy, prefitting considerations, selection, verification, orientation, and validation of hearing aid fittings. Students will complete earmold impressions and modifications, probe microphone measurements, electroacoustic analyses, and hearing aid troubleshooting.

3.00, Classroom | Web Component

CDS-631 Basic Amplification

This course introduces the hearing aid fitting process, including candidacy, selection, verification, orientation and validation. Students will learn about the role of compression in providing audibility and maintaining comfort. Students will obtain hands-on experience, including making earmold impressions, analyzing and troubleshooting hearing aids and measuring real-ear responses.

3.00, Classroom | Web Component

CDS-632 Amplification II

This course expands upon basic hearing instrument technology presented in Amplification I. Selection, verification and validation issues are presented. Emphasis is on advanced concepts and practices as well as current research and trends.

5.00, Classroom | Web Component

CDS-632 Adult Amplification

This course expands upon basic hearing instrument technology presented in Basic Amplification. Selection, verification and validation issues surrounding hearing aid fittings with adults are presented. Emphasis is on advanced concepts and practices as well as current research and trends.

5.00, Classroom | Web Component

CDS-633 Adult & Geriatric Rehabilitation Audiology

Examination of adult audiologic rehabilitation. Visual, auditory, and bi-sensory stimuli in communication are considered along with assessment of communicative function, auditory training, speechreading, amplification, assistive listening devices, rehabilitative strategies and the psychosocial aspects of adult hearing

impairment. The geriatric population and working-age adults will be considered as separate rehabilitative challenges.

4.00, Classroom | Web Component

CDS-634 Pediatric Rehabilitation Audiology

An examination of the strategies involved in the management of children with hearing impairment and deafness. Topics discussed include parent counseling, auditory training, speech and language training and educational opportunities. Various educational models will be covered. The audiologist's role in case management will be discussed.

2.00, Classroom | Web Component

CDS-634 Pediatric Amplification & Habilitation

Students will learn about strategies involved in the management of children with hearing impairment and deafness. Topics include the pediatric fitting process for infants and children, assistive listening devices for classroom and home, communication modalities, auditory skills development, and case management.

3.00, Classroom | Web Component

CDS-634S Pediatric Aural Rehabilitation

Pediatric aural rehabilitation is one of the important domains where Speech-Language Pathology and Audiology overlap. Hearing loss affects communication, and, in children, hearing loss also impedes language development. This course will cover topics related to the effects of hearing loss on communication and language, the assessment thereof, rehabilitative techniques that scaffold listening skills and language development, educational options, and communication strategies. Students will develop knowledge and skills to empower educators, families and children to reach their communication potential within their cultural identity.

2.00, Classroom | Web Component

CDS-635 Cochlear Implants

This course describes and compares various types of cochlear implant technologies. Appropriate assessment, treatment, and management options for cochlear implant patients are described. Principles of speech processing and psychoacoustics are related to the cochlear implant technology.

2.00, Classroom | Web Component

CDS-635 Auditory Implants

This course describes and compares various types of cochlear, middle ear, and osseointegrated implant technologies. Appropriate assessment, treatment and management options for implant patients are described. Principles of speech processing and psychoacoustics are related to the cochlear, middle ear, and osseointegrated implant technology.

3.00, Classroom | Web Component

CDS-636 Educational Audiology

The practice of audiology in the school setting involves special issues and considerations. This course covers federal legislation, identification and assessment practices, case management, IEP development, and the effects of hearing loss on educational programming.

3.00, Classroom | Web Component

CDS-638 Auditory Processing

Students learn the neurophysiologic bases of central auditory processing. The course includes consideration of screening, diagnostic, and management approaches to central auditory disorders.

2.00, Classroom | Web Component

CDS-643 Electrophysiologic Assessment Auditory Systems

This course introduces principles/practices of electrophysiologic methods in audiologic assessment. Special emphasis is on the auditory brain-stem response and its use with both pediatric and adult patients. The course includes basic information on electrocochleography and otoacoustic emissions. Lab assignments are included.

4.00, Class & Lab | Web Component

CDS-644 Pediatric Audiology

Topics in this course include development of auditory behaviors in pediatric patients, the impact of hearing loss on speech/language development, and age-appropriate procedures for the audiologic evaluation of children. Both normal and disordered speech/language development are discussed. Issues related to audiologic intervention and family counseling are also presented.

4.00, Classroom | Web Component

CDS-644 Pediatric Audiology

Topics in this course include an overview of cognitive, motor and language development, pediatric auditory behaviors, the impact of hearing loss on speech/language development and age-appropriate procedures for the audiologic evaluation of children. Issues related to audiologic intervention, multiculturalism, team approaches to case management and family counseling are also presented.

3.00, Classroom | Web Component

CDS-646 Vestibular Assessment & Rehabilitation

Anatomy and physiology of the vestibular and ocular motor systems will be reviewed. Disorders of patients presenting vertiginous symptoms will be discussed with emphasis on technique

and interpretation of ENG/VNG findings. Acceleration measurements will be introduced.

4.00, Classroom | Web Component

CDS-646L Vestibular Assessment Lab

Taken in conjunction with CDS-646. Students develop basic skills in the practical application of ENG/VNG and vestibular rehabilitation.

1.00, Laboratory | Web Component

CDS-648 Advanced Electrophysiologic Assessment

This course builds on the content presented in CDS 643. Topics include advanced concepts in ABR and OAEs, visual and somatosensory responses, and intra-operative monitoring. Theoretic bases and clinical applications are considered for ASSR, and late potentials. Prerequisite: CDS 643.

4.00, Classroom | Web Component

CDS-648 Advanced Electrophysiology

This course builds on the content presented in CDS 643. Topics include advanced concepts in ABR and OAEs, visual and somatosensory responses, and intra-operative monitoring. Theoretic bases and clinical applications are considered for ASSR, and late potentials. Prerequisite: CDS 643.

2.00, Classroom | Web Component

CDS-654 Instrumentation in Audiology

This course provides an introduction to instrumentation used in the measurement of hearing processes. Basics of electricity and electronic components are introduced. Personal computers and their interfacing with audiologic equipment are examined. Calibration and record keeping requirements will be examined for basic and advanced instrumentation used in audiology.

2.00, Classroom

CDS-657 Seminar in Teleaudiology

This seminar focuses on audiologic services delivered via telehealth including screening, diagnosis, rehabilitation and counseling. Contemporary teleaudiology models will be presented and examined. Consumer input, administrative planning, legal and ethical implications and technology needs will be discussed.

1.00-9.00, Classroom | Web Component

CDS-658 Seminar in Tinnitus Assessment & Management

The purpose of this seminar is to provide the fundamental knowledge and skills necessary to help individuals with tinnitus self-manage this symptom and to minimize the negative impact on tinnitus on everyday function and quality of life. This seminar will (1) review research on the current understanding of the

mechanisms of tinnitus, (2) discuss various approaches toward counseling, assessment, and management and (3) examine the treatment of efficacy of current audiological, medical, and cognitive-based management options.

1.00, Classroom | Web Component

CDS-659 Seminar in Ethics

Students will learn to delineate ethical foundations and commitments in audiology and allied health and to identify, analyze, and resolve ethics problems in these fields. Students will apply such tools as identification of their own values, professional codes of ethics, ethical theories and principles, a model for examining the ethics of specific cases, attention to the suffering of the clinician, and organizational ethics. Course will be taught through lecture, reading, discussion, and web events.

Prerequisite: permission of instructor.

2.00, Classroom

CDS-660 Leadership Seminar

Students will learn to understand and develop their own leadership skills. The course engages students in explorations of leadership. Students will analyze selected leadership literature and will examine the work of leaders in audiology, industry, and other areas. Prerequisite: none.

1.00, Classroom | Web Component

CDS-661 Amplification Seminar

This seminar focuses on current, innovative, evidence-based fitting and rehabilitation issues related to personal amplification systems.

1.00, Classroom | Web Component

CDS-661 Advanced Topics in Amplification

This seminar focuses on current, innovative, evidence-based fitting and rehabilitation issues related to personal amplification systems.

1.00, Classroom | Web Component

CDS-662 Supervision & Mentorship AuD

This course addresses key elements of supervision and mentorship, focusing on students. Components include processes that contribute to the goals and various forms of supervision and mentorship; knowledge and skills needed by supervisors and mentors; research and outcome issues in supervision; leadership and supervision; challenges to effective supervision; and other related topics.

2.00, Classroom | Web Component

CDS-676 Vestibular Assessment & Rehabilitation II

Advanced concepts including unilateral peripheral vestibular

differentialism, bedside tests of assessment of VOR and VSR, ENG and VNG, rotational test techniques, VEMP testing, computerized dynamic posturography, fall risk assessment and measurement of dizziness handicap are presented via lecture and hands-on practicum.

2.00, Classroom | Web Component

CDS-680 Investigative Project Plan Seminar

This course will prepare students for conducting an investigative project during their third year in the program. In consultation with the course director and other departmental faculty, the student will generate potential research topics for their investigative projects, evaluate their merits, review methods and regulatory requirements for conducting experimental evidence based practice systematic review projects, perform initial literature review and determine the appropriate research design.

1.00, Classroom | Web Component

CDS-681 Investigative Project

In this directed course, the student will select and analyze a specific clinical, research or professional problem. Completion of the project includes a professional paper and tutorial presentation. Repeatable course.

3.00, Classroom | Web Component

CDS-681 Investigative Project

In this directed course, the student will select and analyze a specific clinical, research or professional problem. Completion of the project includes a professional paper and tutorial presentation. Repeatable course.

2.00, Independent Study | Web Component

CDS-816 Clerkship I

This clerkship sequence is a three-quarter sequence of supervised audiologic patient care in a variety of sites off-campus. Student assumes increasing responsibility and increasing skill competency for the full range of basic and intermediate level audiologic diagnostic and rehabilitative procedures.

Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

4.00, Clinical | Web Component

CDS-816 Internship I

A five-quarter sequence of supervised audiologic patient care in a variety of sites on-and off-campus. Student clinicians will assume increasing responsibility for the full range of basic and intermediate level audiologic diagnostic procedures and interpretation and rehabilitative follow-up. Student clinicians assume caseload management under supervision. Students also experience administrative and practice management activities that are

consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds.

4.00, Internship/Externship | Web Component

CDS-817 Clerkship II

This clerkship sequence is a three-quarter sequence of supervised audiologic patient care in a variety of sites off-campus. Student assumes increasing responsibility and increasing skill competency for the full range of basic and intermediate level audiologic diagnostic and rehabilitative procedures. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

4.00, Clinical | Web Component

CDS-817 Internship II

A five-quarter sequence of supervised audiologic patient care in a variety of sites on-and off-campus. Student clinicians will assume increasing responsibility for the full range of basic and intermediate level audiologic diagnostic procedures and interpretation and rehabilitative follow-up. Student clinicians assume caseload management under supervision. Students also experience administrative and practice management activities that are consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds.

4.00, Internship/Externship | Web Component

CDS-818 Clerkship III

This clerkship sequence is a three-quarter sequence of supervised audiologic patient care in a variety of sites off-campus. Student assumes increasing responsibility and increasing skill competency for the full range of basic and intermediate level audiologic diagnostic and rehabilitative procedures. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

4.00, Clinical | Web Component

CDS-818 Internship III

A five-quarter sequence of supervised audiologic patient care in a variety of sites on-and off-campus. Student clinicians will assume increasing responsibility for the full range of basic and intermediate level audiologic diagnostic procedures and interpretation and rehabilitative follow-up. Student clinicians assume caseload management under supervision. Students also experience administrative and practice management activities that are consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds.

4.00, Internship/Externship | Web Component

CDS-819 Internship I

This internship sequence is a two-quarter sequence of advanced audiologic patient care in an off-campus placement. Student assumes increasing clinical responsibility for caseload management under supervision and demonstrates skill levels commensurate with Internship I and II. The internship experience includes patients from across the lifespan and from diverse cultural backgrounds. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

5.00, Internship/Externship | Web Component

CDS-819 Internship IV

A five-quarter sequence of supervised audiologic patient care in a variety of sites on-and off-campus. Student clinicians will assume increasing responsibility for the full range of basic and intermediate level audiologic diagnostic procedures and interpretation and rehabilitative follow-up. Student clinicians assume caseload management under supervision. Students also experience administrative and practice management activities that are consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds.

5.00, Internship/Externship | Web Component

CDS-820 Internship II

This internship sequence is a two-quarter sequence of advanced audiologic patient care in an off-campus placement. Student assumes increasing clinical responsibility for caseload management under supervision and demonstrates skill levels commensurate with Internship I and II. The internship experience includes patients from across the lifespan and from diverse cultural backgrounds. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

5.00, Internship/Externship | Web Component

CDS-820 Internship V

A five-quarter sequence of supervised audiologic patient care in a variety of sites on-and off-campus. Student clinicians will assume increasing responsibility for the full range of basic and intermediate level audiologic diagnostic procedures and interpretation and rehabilitative follow-up. Student clinicians assume caseload management under supervision. Students also experience administrative and practice management activities that are consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds.

5.00, Internship/Externship | Web Component

CDS-891 Externship I

This externship sequence is a full-time advanced audiologic clinical placement under the direction of the audiology clinical education coordinator and preceptor. Externship is off-campus and emphasizes increasing independence with clinical practice as well as participation in clinical operations, administrative and professional activities. Student demonstrates skill levels commensurate with Externship competencies. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

8.00, Internship/Externship | Web Component

CDS-892 Externship II

This externship sequence is a full-time advanced audiologic clinical placement under the direction of the audiology clinical education coordinator and preceptor. Externship is off-campus and emphasizes increasing independence with clinical practice as well as participation in clinical operations, administrative and professional activities. Student demonstrates skill levels commensurate with Externship competencies. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

8.00, Internship/Externship | Web Component

CDS-893 Externship III

This externship sequence is a full-time advanced audiologic clinical placement under the direction of the audiology clinical education coordinator and preceptor. Externship is off-campus and emphasizes increasing independence with clinical practice as well as participation in clinical operations, administrative and professional activities. Student demonstrates skill levels commensurate with Externship competencies. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

8.00, Internship/Externship | Web Component

CDS-894 Externship IV

This externship sequence is a full-time advanced audiologic clinical placement under the direction of the audiology clinical education coordinator and preceptor. Externship is off-campus and emphasizes increasing independence with clinical practice as well as participation in clinical operations, administrative and professional activities. Student demonstrates skill levels commensurate with Externship competencies. Prerequisites: Each course has prerequisites-check with course director for specific prerequisites.

8.00, Internship/Externship | Web Component

CDS-900 Independent Study

Independent study courses give students a unique opportunity

to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study

CDS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

CHS-501 Introduction to Biostatistics for the Health Scientist

This course will focus on concepts and procedures for descriptive and inferential statistics for continuous and discrete data and data analysis using parametric and nonparametric statistical procedures. Computerized statistical programs, such as SPSS, will be used.

3.00, Classroom | Web Component

CHS-501U Introduction to Biostatistics for the Health Scientist

This course will focus on concepts and procedures for descriptive and inferential statistics for continuous and discrete data and data analysis using parametric and nonparametric statistical procedures. Computerized statistical programs, such as SPSS, will be used.

3.00, Classroom

CHS-502 Research Methods

This course introduces students to methods of scientific research to include review of literature, research designs, sampling techniques, measurement, and related issues. Research articles and research thesis that exemplify various research designs, presentation of results, and conclusions will be reviewed and discussed.

1.00-5.00, Classroom | Web Component

CHS-502U Research Methods

This course introduces students to methods of scientific research to include review of literature, research designs, sampling techniques, measurement, and related issues. Research articles

and research thesis that exemplify various research designs, presentation of results, and conclusions will be reviewed and discussed.

3.00, Classroom

CHS-503 Research & Statistical Methods

An introduction to the methods of scientific research, including research design and statistical analysis. Critical review of the components of research reports will be performed to include definition of a research problem, review of the literature, research design, data analysis, and results reporting. This course will be taught as an online course.

5.00, Online Only

CHS-510 Health Care in America

Health Care in America is designed for students who are entering a health profession. Faculty leaders from across the Medical Center present topics that address contemporary issues in America's health care system. Examples include the organization and delivery system, the economics and financing of health care, the national's health care workforce, long-term care, technology and health care, biomedical ethics, health policy and the public's health, and future directions of America's health care system. Following presentations, the class breaks into interdisciplinary groups lead by faculty to explore those and other class developed questions about health care in America.

2.00, Online Only

CHS-510M Health Care in America

Health Care in America is designed for graduate students who are entering a health care profession. Faculty leaders from across Rush University Medical Center present topics that address contemporary issues in America's health care system. Examples include the organization and delivery of health services, the economics and financing of health care, the nation's health care workforce, access to and quality of health services, health policy and the public's health, and future directions of America's health care system. The class breaks into interdisciplinary groups to explore these issues in depth through team-based experiential learning.

2.00, Classroom

CHS-510U Health Care in America

Health Care in America is designed for graduate students who are entering a health care profession. Faculty leaders from across Rush University Medical Center present topics that address contemporary issues in America's health care system. Examples include the organization and delivery of health services, the economics and financing of health care, the nation's health care workforce, access to and quality of health services,

health policy and the public's health, and future directions of America's health care system. The class breaks into interdisciplinary groups to explore these issues in depth through team-based experiential learning.

2.00, Classroom

CHS-531 Introduction to Human Disease

This course provides a conceptual approach to alterations in normal anatomic structure and function. General and system specific concepts related to the causation and clinical presentations of pathology across the life span are discussed. Prototype diseases are used to illustrate pathologic concepts.

2.00, Online Only

CHS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Independent Study

CLM-584 Health Care Finance

This course is designed to provide a broad introduction to the concepts contained in health care finance. These concepts include: an introduction to basic accounting such as the accounting equation, generally accepted accounting principles, financial statements, and health care reimbursement. The course utilizes web-based learning, power point presentations, camtasia presentations, and assigned book chapters. Student learning will be evaluated through online discussions, homework assignments and exams administered through the online learning management system.

4.00, Online Only

CLM-586 Compliance & Regulatory Issues

The rapidly changing legal environment of health care affects clinical laboratories. Laboratory managers must have a working knowledge of the legal system, and statutes, regulation, and case law which affects them. This course provides a web-based approach to learning the essential legal issues affecting laboratory management, using cases, statutes, and regulations. Learning unites are organized to cover an introduction to the American legal system, health care system organization, relationship between the patient and the lab, health care

information and privacy, civil tort liability of the lab, criminal liability and penalties, and protection of intellectual property. Topics are subject to change as new legal issues arise. LT grade 4.00, Online Only

CLM-587 Organizational Development

The rapidly changing trends in healthcare & the laboratory setting force organizations to respond to change for overall survival. Organizational development is a collection of concepts that focuses on employees roles within organizations, and how to make working relationships function best. This course will provide the learner with the tools to effectively, economically, and strategically make changes to improve their services. It will explore the major trends & issues in organizational development as it applies to the laboratory. A Web-based learning approach will be used to present the concepts. Book chapters, case studies, relevant articles, and website resources will provide the learner with advanced & current information in each of the major topic areas. Topics in the course include leadership, understanding employee motivation, developing effective work teams, managing organizational change, intervention techniques, & conflict negotiation skills. Application of knowledge to real-life situations will be accomplished through case studies, discussion boards, and current event topics. LT grade 4.00, Online Only

CLM-588 Legal Issues in Health Care

The rapidly changing legal environment of health care affects clinical laboratories. Laboratory managers must have a working knowledge of the legal system, and statutes, regulations, and case law which affects them. This course provided a web-based approach to learning the essential legal issues affecting laboratory management, using cases, statutes, and regulations. Learning units are organized to cover an introduction to the American legal system, health care system organization, relationship between the patient and the lab, health care information and privacy, civil tort liability of the lab, criminal liability of the lab, criminal liability & penalties, and protection of intellectual property. Topics are subject to change as new legal issues arise. LT grade 4.00, Online Only

CLM-589A Management Experience I

This course represents the first step in a three-part process to complete a Management practicum for the successful completion of the Masters of Science in Clinical Laboratory Management. The Masters Management Practicum is divided into three courses: CLM 589-A, 589-B and 589-C corresponding to Management Practicum I, II, III. The practicum introduces

students to laboratory administration policy, procedure and operations.

2.00, Independent Study

CLM-589B Management Practicum II

This course represents a three-part process to complete a Management practicum for the successful completion of the Masters of Science in Clinical Laboratory Management. The Management Practicum is divided into three courses: CLM 589-A, 589-B, and 589-C corresponding to Management Practicum I, II, and III. Student projects (completed in CLM 589-A,B,C) are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. The practicum, however, introduces the student to management practices utilized by Laboratory Managers. Current practice requires laboratory managers to take decisive actions in areas of operational, fiscal, and human resource management. The Clinical Laboratory Management practicum is designed to provide exposure to the skills necessary to perform successfully in a laboratory management role. This practicum will provide students with experience in the various tasks of laboratory management including planning, organizing, controlling, staffing, and evaluation. Special emphasis will be placed upon laboratory operations, personnel administration, regulations and operating budgets. The practicum prepares the graduate student to assume the duties of a laboratory manager. This course is essential for all management professionals who pursue a career in Healthcare Management.

2.00, Online Only

CLM-589B Management Experience II

A continuation of CLM 589A in which the student completes additional management-related activities.

2.00, Independent Study

CLM-589C Management Practicum III

This course represents a three-part process to complete a Management practicum for the successful completion of the Masters of Science in Clinical Laboratory Management. The Management Practicum is divided into three courses: CLM 589-A, 589-B, and 589-C corresponding to Management Practicum I, II, and III. Student projects (completed in CLM 589-A,B,C) are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. The practicum, however, introduces the student to management practices utilized by Laboratory Managers. Current practice requires laboratory managers to take decisive actions in areas of operational, fiscal, and human resource management. The Clinical Laboratory Management practicum is designed to provide exposure to the skills necessary to perform successfully in a

laboratory management role. This practicum will provide students with experience in the various tasks of laboratory management including planning, organizing, controlling, staffing, and evaluation. Special emphasis will be placed upon laboratory operations, personnel administration, regulations and operating budgets. The practicum prepares the graduate student to assume the duties of a laboratory manager. This course is essential for all management professionals who pursue a career in Healthcare Management. 2.00, Online Only

CLM-589C Management Experience III

A continuation of CLM 589B in which the student completes additional management-related activities. 2.00, Independent Study

CLM-590 Principles of Lab Management

The rapidly changing laboratory environment is constantly responding to diverging trends in healthcare. This mandates the requirement for effective management. Laboratory managers will need to create new solutions to today's problems. This course is designed to provide a web-based learning approach to teaching the principles of laboratory management. The focus is to present underlying managerial concepts and then assist the learner in the successful application of this information to real-life situations. Book chapters, Internet references and website resources permit the learner to acquire advanced and current information in each of the major topic areas. Learning units are organized to cover four major areas of management: Basic Principles and Organizational Structure, Human Resources, Finance, and Operations. 4.00, Online Only

CLM-591 Evidence Based Research/Applied Statistics

Introduction to research methods within the context of health care outcomes. Emphasis on conceptual understanding of scientific reasoning, research design, data collection methods, analysis, interpretation, and ethical standards in research. Online lecture material, textbook chapters, and internet references will allow the learner to reach a high level of understanding and be prepared to apply statistical knowledge in the laboratory with a focus on evidence-based research. 4.00, Online Only

CLM-592 Ethics

This course examines the ethical issues in the contexts of medical laboratory science and the practice of management. Ethical decision-making and critical thinking is examined in the context of current healthcare issues. The course will introduce the students to the principles of health care ethics, codes of ethics, administrative practice including the decision-making process allowing them to explore issues and raise questions. An in-depth series of ethical

issues and behaviors are presented and analyzed. Case studies and on-line discussions will focus on the dynamics between professional ethics and organizational ethics within healthcare. 3.00, Online Only

CLM-593 Scientific & Technical Writing

This course is designed to develop your scientific and technical writing. It emphasizes a systematic approach to enable you to produce a variety of scientific and technical communications in a well-presented, clear, concise style. You will review the effective use of library scientific resources to help you comprehend the flow of scientific information. This course will prepare you to write and submit a paper to a journal of your choice. This writing course is directed toward those individuals in technical and scientific fields whose increasing specialization requires them to communicate through scientific papers, case studies, technical reports, procedural manuals, strategic planning documents, scientific abstracts, and project reports. An introduction to grant writing will also be included to prepare the student for a successful career in laboratory science. 4.00, Online Only

CLM-594 Health Care Finance

This course is designed to provide students with advanced knowledge in financial management. Successful managers must be able to analyze financial information such as budgets, income statements, and cash flows. Students will be introduced to topics including financial accounting, budgets, capital equipment acquisition, billing and collection, reimbursement issues, contract negotiations and materials management. The content of this course builds on the information delivered in CLM-584. This course employs a web-based learning approach for students to gather information through book chapters, PowerPoint presentations, and additional readings and internet resources. Knowledge will be demonstrated through online discussions, homework assignments, and online examinations. 4.00, Online Only

CLM-594 Advanced Health Care Finance

This course is designed to provide students with advanced knowledge in financial management. Successful managers must be able to analyze financial information such as budgets, income statements, and cash flows. Students will be introduced to topics including financial accounting, budgets, capital equipment acquisition, billing and collection, reimbursement issues, contract negotiations and materials management. The content of this course builds on the information delivered in CLM-584. This course employs a web-based learning approach for students to gather information through book chapters, PowerPoint presentations, and additional readings and internet resources.

Knowledge will be demonstrated through online discussions, homework assignments, and online examinations.

4.00, Online Only

CLM-595 Method Comparison/Process Validation

This course is designed to prepare laboratory professionals to understand the principles and procedures used to verify manufacturer's claims of analytical performance for in vitro diagnostic products. Emphasis on determining if total allowable error is exceeded will be highlighted. Topics include: compliance with proficiency testing requirements, validation of reference ranges, determination of decision cut-off points, and outcome assessment.

4.00, Online Only

CLM-596 Quality Systems & Regulator Issues

The complexity of operating a clinical laboratory requires an in depth knowledge of quality systems as well as knowledge of the regulatory requirements at both national and local levels. Laboratory managers will need to understand the principles of the quality system essentials (QSE) and be able to implement a quality management system (QMS). This course is designed to provide a web-based learning approach to teaching the principles of quality management and laboratory regulation. The focus is to present the twelve quality system essential concepts, which are the building blocks of the QMS, to introduce the path of workflow within the laboratory and how to establish a quality management system. The learner will be assisted in the successful application of this information to real-life situations. Book chapters, articles from professional journals, Internet references and website resources permit the learner to acquire advanced and current information in each of the major topic areas. Learning units are organized to cover the twelve quality system essentials and an overview of clinical laboratory regulation.

4.00, Online Only

CLM-597 Issues & Practices in HR Management

Medical Laboratory Scientists and in particular Specialists in Blood Banking typically find themselves in either the hospital laboratory setting or in Blood Centers. A knowledge and understanding of the operational and strategic role that Human Resource Management plays in the organization is essential to incorporating the concepts into their role in the organization. A Web-based learning approach will be used to present concepts of Human Resource Management in healthcare organizations. Book chapters, case studies, Internet references, and website resources will permit the learner to acquire advanced and current information in each of the major topic areas. Learning units are organized to cover the main areas of Human Resource Management for Healthcare organizations: Recruitment and

Hiring; Training and Development; Compensation and Benefits; Labor Relations both union and non-union; and Health and Safety. From Labor Laws to succession planning, this course will cover the many aspects of Human Resource Management. Application of knowledge to real-life situations will be accomplished through case studies and discussion boards.

4.00, Online Only

CLM-598 Health Care Informatics

Today's clinical laboratory relies heavily on information systems to manage patient care, generate billing, and to connect with care providers and patients. Laboratory managers will need to understand system architecture, design, and maintenance. This course is designed to provide a web-based learning approach to teaching the principles of laboratory information systems management, and reviews processes for selection, installation, building test dictionaries, validation, training and integration with electronic health records. The learner will be assisted in the successful application of this information to real-life situations. Book chapters, articles from professional journals, Internet references and website resources permit the learner to acquire advanced and current information in each of the major topic areas.

4.00, Online Only

CLM-599A Master's Project I (Management)

This course represents the first step in a three-part process to complete a Management project and practicum for the successful completion of the Masters of Science in Clinical Laboratory Management. The Masters Management Project/ Practicum is divided into three courses: CLM 599-A, 599-B, and 599-C corresponding to Masters Project/ Practicum I, II, III (Management) Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. The first course establishes the topic and a current literature search is performed and submitted to the Course Director for final approval from the department. The second course involves submitting a proposal, and the third course involves submitting the final paper which should be of publishable quality for submission to a management journal of your choice. It is customary for the student to consult their immediate Administrator/Supervisor to see if there is a project that would benefit the institution. The practicum part of the course introduces students to laboratory administration policy, procedure and operations.

2.00, Online Only

CLM-599B Master's Project II (Management)

This course represents the first step in a three-part process to complete a Management project and practicum for the

successful completion of the Masters of Science in Clinical Laboratory Management. The Masters Management Project/ Practicum is divided into three courses: CLM 599-A, 599-B, and 599-C corresponding to Masters Project/ Practicum I, II, III (Management) Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. The first course establishes the topic and a current literature search is performed and submitted to the Course Director for final approval from the department. The second course involves submitting a proposal, and the third course involves submitting the final paper which should be of publishable quality for submission to a management journal of your choice. It is customary for the student to consult their immediate Administrator/Supervisor to see if there is a project that would benefit the institution. The practicum part of the course introduces students to laboratory administration policy, procedure and operations.

2.00, Online Only

CLM-599C Master's Project III (Management)

This course represents the first step in a three-part process to complete a Management project and practicum for the successful completion of the Masters of Science in Clinical Laboratory Management. The Masters Management Project/ Practicum is divided into three courses: CLM 599-A, 599-B, and 599-C corresponding to Masters Project/ Practicum I, II, III (Management) Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. The first course establishes the topic and a current literature search is performed and submitted to the Course Director for final approval from the department. The second course involves submitting a proposal, and the third course involves submitting the final paper which should be of publishable quality for submission to a management journal of your choice. It is customary for the student to consult their immediate Administrator/Supervisor to see if there is a project that would benefit the institution. The practicum part of the course introduces students to laboratory administration policy, procedure and operations.

2.00, Online Only

CLM-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study | Web Component

CLM-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral

students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

CLS-300 Laboratory Fundamentals

Comprehensive instruction in laboratory mathematics, laboratory techniques and safety. Medical terminology included as an online component. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

CLS-301 Clinical Chemistry I

Biochemistry, analysis and application of clinically significant chemical substances. Theory, maintenance and operation of basic equipment such as pipeting devices, balances, centrifuges, spectrophotometers and electrophoretic cells. Introduction to quality control and correlation of data for selected disease states. Covers proteins, carbohydrates and enzymes. Course includes a laboratory component. Prerequisite: Departmental permission.

4.00, Class & Lab | Web Component

CLS-302 Clinical Chemistry II

Biochemistry, analysis and application of clinically significant chemical substances. Second in a series of three courses. Theory of ion selective electrodes, osmometry, co-oximetry, and automated immunoassay analysis. Covers lipids, cardiac markers, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states.

3.00, Classroom | Web Component

CLS-303 Clinical Chemistry III

Biochemistry, analysis and application of clinically significant chemical substances. Second in a series of three courses. Theory of ion selective electrodes, osmometry, co-oximetry, and automated immunoassay analysis. Covers lipids, cardiac markers, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states.

3.00, Classroom | Web Component

CLS-306 Advanced Laboratory Fundamentals

This course consists of a review of mathematical and laboratory techniques followed by a comprehensive evaluation and additional advanced theory. An online medical vocabulary competency is included. Prerequisite: Departmental permission. P/N grading. [v-v-v]

2.00, Online Only

CLS-307 Advanced Clinical Chemistry I

This course consists of a review of clinical chemistry concepts followed by a comprehensive evaluation and additional advanced theory in clinical chemistry. Component topics include analysis and application of clinically significant chemical substances. Theory, maintenance and operation of equipment such as pipeting devices, balances, centrifuges, spectrophotometers and electrophoretic cells. Quality control and correlation of data for selected disease states is presented. Covers proteins, carbohydrates and enzymes.

2.00-3.00, Online Only

CLS-308 Advanced Clinical Chemistry II

This course consists of a review of clinical chemistry concepts followed by a comprehensive evaluation and additional advanced theory in clinical chemistry. Second in a series of three courses. Theory of ion selective electrodes, immunoassay analysis, chemistry and immunoassay automation platforms. Covers lipids, non-protein nitrogens, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states. Prerequisite: Departmental permission.

P/N grading.

3.00, Online Only

CLS-309 Advanced Clinical Chemistry III

This course consists of a review of clinical chemistry concepts followed by a comprehensive evaluation and additional advanced theory in clinical chemistry. Biochemistry, analysis and application of clinically significant chemical substances. Third in a series of three courses. Theory of chromatography and atomic absorption spectrophotometry. Covers therapeutic drug analysis, trace metals, endocrinology, vitamins, toxicology, fetal/maternal testing and current trends. Includes correlation of data for selected disease states.

3.00, Online Only

CLS-310 Hematology I

This course is designed to introduce basic hematologic concepts and clinical applications. These concepts and applications will be applied to the discussion of erythrocytes and leukocytes.

Erythrocyte topics include: Venipuncture, complete blood counts (CBCs), hemopoietic theory, erythrocyte metabolism and hemoglobin synthesis, introduction to erythrocyte dyscrasias including anemias of various disease etiologies, hemoglobinopathies, and thalassemias. Leukocyte topics include: Leukopoiesis, FAB classifications of leukemias, leukocyte dyscrasias of various etiologies, and lymphomas of various origins. Laboratory sessions included.

5.00, Class & Lab | Web Component

CLS-311 Hematology II

This course is designed to introduce basic concepts in coagulation and hemostasis. Topics include: megakaryopoiesis, hemostasis and coagulation, description and definitions of various coagulopathies of known and unknown etiologies. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

CLS-312 Body Fluid Analysis

Analysis of various body fluids with emphasis on the theory and practice of clinical procedures. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates and exudates. Laboratory component included.

4.00, Class & Lab | Web Component

CLS-317 Advanced Hematology I

This course consists of a review of hematologic concepts followed by a comprehensive evaluation and additional advanced theory in clinical hematology including hematopoiesis, development, metabolism, kinetics, and function of red cells, white cells, and platelets and associated hematologic disorders. Prerequisite: Departmental permission. P/N grading.

2.00-3.00, Online Only

CLS-319 Advanced Body Fluid Analysis

This course consists of a review of concepts in urinalysis and body fluid analysis followed by a comprehensive evaluation and additional advanced theory. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates, and exudates.

2.00, Online Only

CLS-320 Clinical Immunohematology

Blood group antigens and antibodies from the discoveries of Landsteiner in 1900 to the present day are studied. Blood banking procedures involved in drawing, testing, storing, and transfusing whole blood and its components are discussed. The laboratory section will deal with the basic blood bank procedures including ABO grouping. RH typing, compatibility testing and special antibody studies. Prerequisite: Departmental Permission.

5.00, Class & Lab | Web Component

CLS-321 Clinical Immunology

An introduction to the basic concepts and terminology of immunity including development, structure and function of the lymphoid systems; the basis of antigenicity; antibody structure;

methods of detection and measurement; mechanism of cellular immunity; white cell function; hypersensitivity reactions; the complement system; and mechanisms of immune suppression and tolerance. In the laboratory portion of the class, students become familiar with the purpose, principles, performance and interpretation of various serological tests used routinely in the clinical laboratory for the diagnosis of syphilis and other infectious diseases, as well as, autoimmune diseases such as rheumatoid arthritis and thyroiditis. Prerequisite: Departmental permission.

4.00, Class & Lab | Web Component

CLS-330 Clinical Microbiology

Course focuses on the diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Laboratory activities familiarize the student with the colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays. These activities are then applied to the identification of unknown bacterial isolates found in patient specimens.

5.00, Class & Lab | Web Component

CLS-331 Parasitology Mycology & Virology

This course provides clinical background in mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. The laboratory portion consists of identification, specimen collection and processing of medically important viruses, fungi and parasites.

4.00, Class & Lab | Web Component

CLS-338 Advanced Microbiology

This course consists of a review of clinical microbiology concepts followed by a comprehensive evaluation and additional advanced theory in clinical microbiology including diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Includes laboratory experiences dealing with diagnostic tests performed in a clinical activities familiarize the student with the colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays.

2.00, Online Only

CLS-339 Advanced Parasitology Mycology Virology

This course consists of a review of clinical concepts followed by

a comprehensive evaluation and additional advanced theory in clinical mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. Includes laboratory experiences dealing with diagnostic tests and identification, specimen collection and processing of medically important viruses, fungi and parasites.

2.00-3.00, Online Only

CLS-344 Professional Development I

Course introduces the student to the profession of clinical laboratory science. The various professional, accrediting and certifying organizations are discussed. Students learn about the profession from experienced clinical laboratory scientists. The past, present and future of the profession are discussed including present and future trends in education and employment.

1.00, Classroom | Web Component

CLS-345 Professional Development II

Course focus is on professional issues, professional conduct and ethics. Students discuss various trends and factors that affect the profession. An in-depth series of ethical issues and behavior are presented and analyzed. Scientific integrity and responsible conduct are discussed.

1.00, Classroom

CLS-346 Professional Development III

Students participate in professional enrichment projects. These projects are divided up into five areas which reflect the mission of Rush University Medical Center. These areas are: patient care, education, research, personal development and community health. The student will complete the assigned project as well as one of the elective projects. Prerequisite: Departmental permission. P/N grading.

1.00, Classroom

CLS-413 Hematology Case Studies

Review of erythrocyte, leukocyte, and coagulation disorders through the use of case studies. Critical thinking is used to analyze patient histories, clinical symptoms, and significant laboratory findings. Prerequisite: CLS 311/511.

2.00, Online Only

CLS-422 Clinical Immunology II

A continuation of CLS 321/521. Topics include the immune response and the laboratory testing related to measuring the immune response. The pathogenesis and laboratory diagnosis of immunological disorders such as hypersensitivities, immune deficiencies, and autoimmunity. Developing and solving case studies involving immune disorders will be an important aspect of learning about these diseases.

2.00, Classroom | Web Component

CLS-432 Infectious Disease Case Studies

This course will provide the student with the opportunity to analyze patient laboratory information in order to diagnose the infectious disease. The student will analyze prepared case studies and answer questions regarding the case and the causative agent in the form of homework assignments, class discussions and by composing their own case study with information from the literature, textbooks, and the Internet.

2.00, Online Only

CLS-433 Molecular Techniques

The molecular biology course consists of an introduction to the principles, methodologies and applications of molecular biological procedures used in the clinical laboratories. Emphasis is placed on the molecular biological procedures used in the identification of infectious agents that cause human disease and in the detection of mutations resulting in neoplasm or congenital disorders. Laboratory component included. Prerequisite: Departmental permission.

4.00, Class & Lab | Web Component

CLS-440 Clinical Lab Science Seminar I

This course is designed as a research seminar during which students and faculty present clinical laboratory science research topics for discussion. Various research designs, sampling techniques and data analysis methods are discussed. Prerequisite: Departmental Permission.

2.00, Classroom | Web Component

CLS-447 Professional Development IV

Course involves participation in a professional enrichment project. Projects include, but are not limited to, the following: practical experience at alternate sites in which Clinical Laboratory Scientists work, e.g. local clinics, health centers, nursing homes, research facilities, various industrial firms, and/or community hospitals; community activities such as presenting information sessions to senior citizen groups, various professional groups or at local association and club meetings; participation in the development of science fair projects and science fair judging at local area schools; areas of special research interests; other areas chosen for their enrichment potential.

1.00, Classroom

CLS-448 Professional Development V

Course involves various professional guest speakers from alternate sites in which Clinical Laboratory Scientists work, i.e. industrial firms, specialty hospitals, research facilities, etc. The professional will present to the students about their specific job, relating it to clinical laboratory sciences. The purpose of

these sessions is to inform the students of multiple professional opportunities for Clinical laboratory sciences in addition to working in a traditional hospital laboratory.

1.00, Classroom

CLS-449 Professional Development VI

Continuation of CLS 448/548

1.00, Classroom

CLS-450 Lab Info & Automation Systems

Presents an overview of total laboratory automation systems (TLA) and clinical laboratory information systems (LIS) including system functionality, selection, installation, validation, maintenance, security and interfaces. Topics include the electronic health record (EHR) and clinical information systems that interface with the LIS. The purpose of selected hardware, the operating system and specialized software will be reviewed.

2.00, Classroom | Web Component

CLS-451 Quality Issues in Clinical Lab Science

This course presents methods and strategies to ensure quality testing in all types of laboratory settings including point of care testing (POCT) and physicians' office laboratories (POLs). Topics include quality assurance, proficiency testing, method evaluation, establishing reference values and predictive value statistics. Common POCT devices will be described and students will learn how laboratory professionals ensure the competency of individuals performing POCT. The regulatory bodies involved in these processes will be introduced.

2.00, Classroom | Web Component

CLS-452 Regulatory Issues

Covers the history and impact of government and private controls on the quality and accessibility of laboratory services. Topics include: OSHA, HIPAA, test reimbursement, direct access testing, professional certification, licensure, unionization, and educational program accreditation. Students will examine proposed state and federal legislation and learn ways to influence passage of good laboratory-related law. The professional/public image of the CLS profession will also be discussed. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

CLS-453 Communications

Interpersonal and organizational communication techniques for creating effective communication with subordinates, peers and managers. Consultation and project management techniques will be included.

2.00, Classroom | Web Component

CLS-455 Lab Supervision and Education

Fundamentals of management and supervision including human resource management, finance and reimbursement, quality assessment and improvement, leadership, communication, and decision making/judgment skills will be emphasized. Interactive sessions employing problem based learning techniques help the student understand important leadership and management concepts. Prerequisite: Departmental permission.
2.00, Classroom | Web Component

CLS-456 Clinical Laboratory Management

Management of the clinical laboratory will be covered in this course with topics to include: operational aspects of the laboratory, human resource management, financial considerations of running a laboratory, error management, personality and leadership styles, and crisis and disaster management. Students will participate in interactive sessions designed to help them understand and develop important leadership and management concepts. Prerequisite: Departmental permission.
2.00, Classroom | Web Component

CLS-460 Research Seminar I

This course is designed to provide an introduction to various research methods ranging from the highly quantitative to broad qualitative approaches. Formulation of the research hypotheses, or questions, ethical issues, literature search techniques, the writing of the research proposal/final research report and the dissemination of research findings are discussed. Statistics and interpretation of research findings are included. This course is designed to provide the first-time researcher with the skills to undertake research in areas of their choice.
2.00, Classroom

CLS-461 Research Seminar II

Continuation of CLS 460/560. Additional statistical measures used in research data analysis are presented and discussed. Students are expected to present research articles in the field of clinical laboratory science for discussion and critique. Current researchers in various areas related to clinical laboratory science present their research designs as examples of how to plan and conduct research. Students will be introduced to the institutional IRB requirements and will complete the on-line training module on preparing for an IRB review. Ethical issues in health care related research, conflicts of interest, intellectual property issues, authorship and collaboration will be discussed.
2.00, Classroom

CLS-462 Research Seminar III

Continuation of CLS 461/561. This course is tutorial based. Students work with their major advisor and project committee

members to complete their master's project for final defense. P/N grading. Prerequisite: Departmental permission.
2.00, Classroom

CLS-467 Comprehensive Review

A comprehensive review of Hematology, Body Fluids, Clinical Chemistry, Laboratory Mathematics, Immunology, Immunochemistry, Molecular Diagnostics, and Microbiology. This review course prepares students for the national certification examinations. At the completion of the review all student take a comprehensive examination. Successful passing of all sections of the comprehensive examination is required for completion of the course and for graduation.
2.00, Online Only

CLS-470 Clinical Practicum-Chemistry

The practicum builds upon the theoretical knowledge and techniques learned during year one in the CLS clinical chemistry laboratory and lecture courses. The rotation is designed to introduce students to the working environment of a clinical chemistry laboratory and provide opportunities for students to work with state of the art chemistry instrumentation and techniques.
4.00, Practicum | Web Component

CLS-471 Clinical Practicum-Hematology

Course includes application of basic skills learned in Hematology course work. This is a clinical rotation through the hospital hematology laboratory. Basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies, special hematologic testing techniques, bone marrow techniques, and coagulation are included.
4.00, Practicum | Web Component

CLS-472 Clinical Practicum-Microbiology I

Rotation through the clinical bacteriology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.
4.00, Practicum | Web Component

CLS-473 Clinical Practicum-Microbiology II

Rotation through the specialty laboratory laboratories of clinical microbiology including parasitology, anaerobes, mycobacteriology, mycology and virology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.
4.00, Practicum | Web Component

CLS-474 Clinical Practicum-Immunochemistry

Rotation through the hospital blood bank laboratory. Applications of basic skills learned in student laboratory are

practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Practicum | Web Component

CLS-475 Clinical Practice Immunology/Molecular Diagnostics

Rotation through clinical immunology and molecular diagnostic laboratories. Applications of basic skills learned in the student laboratory are practiced. Areas included are serology, histocompatibility typing, flow cytometry, karyotyping, molecular oncology, nucleic acid amplification, DNA sequencing, FISH probe analysis and other diagnostic procedures.

4.00, Practicum | Web Component

CLS-476 Clinical Practicum-Education

Students will assist in the instruction of the student laboratory sessions. They will work with the course director in the preparation and execution of laboratory experiments by first year students. Educational principles and curriculum planning skills will be learned through online discussions and exercises.

4.00, Practicum | Web Component

CLS-477 Clinical Specialty Practicum

The Specialty Practicum provides students with an opportunity to select a specific laboratory of interest to them. Students spend four weeks developing advanced techniques and exploring the latest technology available in the clinical laboratory. Areas may include bone marrow cell analysis, advanced genetics, advanced hematology, retrovirology and laboratory safety.

4.00, Practicum | Web Component

CLS-478 Patient Care Techniques

Techniques of specimen collection and phlebotomy are discussed and practiced. Students will perform a minimum of 50 venipuncture procedures on in-house patients throughout the various areas of the hospital and in the outpatient clinics. Pediatric and geriatric patients are included, as are general adult population patients. Procedures for specimen processing and ordering are learned. Procedures for specimen collection and handling with an emphasis pre-analytical situations, documentation, transportation requirements and infection control are covered in this course. Students will also learn about basic phlebotomy equipment and techniques involved in specimen collection, including venipuncture and capillary collection procedures on adult and children populations.

2.00, Practicum | Web Component

CLS-479 Clinical Practicum-Career Mobility

Rotation through the various diagnostic clinical laboratories. Students will be evaluated on their skills and knowledge and

complete the additional competencies required in the regular program clinical practica.

1.00-4.00, Practicum

CLS-500 Laboratory Fundamentals

Comprehensive instruction in laboratory mathematics, laboratory techniques and safety. Medical terminology included as an online component. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

CLS-501 Clinical Chemistry I

Biochemistry, analysis and application of clinically significant chemical substances. Theory, maintenance and operation of basic equipment such as pipeting devices, balances, centrifuges, spectrophotometers and electrophoretic cells. Introduction to quality control and correlation of data for selected disease states. Covers proteins, carbohydrates and enzymes. Course includes a laboratory component. Prerequisite: Departmental permission.

4.00, Class & Lab | Web Component

CLS-502 Clinical Chemistry II

Biochemistry, analysis and application of clinically significant chemical substances. Second in a series of three courses. Theory of ion selective electrodes, osmometry, co-oximetry, and automated immunoassay analysis. Covers lipids, cardiac markers, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states.

3.00, Classroom | Web Component

CLS-503 Clinical Chemistry III

Biochemistry, analysis and application of clinically significant chemical substances. Third in a series of three courses. Theory of chromatography, trace/heavy metal analysis and identification of toxins. Covers pharmacokinetics, therapeutic drug monitoring, endocrinology, toxicology, fetal/maternal testing and current trends. Includes correlation of data for selected disease states.

3.00, Classroom | Web Component

CLS-506 Advanced Laboratory Fundamentals

This course consists of a review of mathematical and laboratory techniques followed by a comprehensive evaluation and additional advanced theory. An online medical vocabulary competency is included.

2.00, Online Only

CLS-507 Advanced Clinical Chemistry I

This course consists of a review of clinical chemistry concepts followed by a comprehensive evaluation and additional advanced theory in clinical chemistry. Component topics include

analysis and application of clinically significant chemical substances. Theory, maintenance and operation of equipment such as pipeting devices, balances, centrifuges, spectrophotometers and electrophoretic cells. Quality control and correlation of data for selected disease states is presented. Covers proteins, carbohydrates and enzymes. Prerequisite: Departmental permission. P/N grading.

3.00, Online Only

CLS-508 Advanced Clinical Chemistry II

This course consists of a review of clinical chemistry concepts followed by a comprehensive evaluation and additional advanced theory in clinical chemistry. Second in a series of three courses. Theory of ion selective electrodes, immunoassay analysis, chemistry and immunoassay automation platforms. Covers lipids, non-protein nitrogens, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states.

3.00, Online Only

CLS-509 Advanced Clinical Chemistry III

This course consists of a review of clinical chemistry concepts followed by a comprehensive evaluation and additional advanced theory in clinical chemistry. Biochemistry, analysis and application of clinically significant chemical substances. Third in a series of three courses. Theory of chromatography and atomic absorption spectrophotometry. Covers therapeutic drug analysis, trace metals, endocrinology, vitamins, toxicology, fetal/maternal testing and current trends. Includes correlation of data for selected disease states.

3.00, Online Only

CLS-510 Hematology I

This course is designed to introduce basic hematologic concepts and clinical applications. These concepts and applications will be applied to the discussion of erythrocytes and leukocytes.

Erythrocyte topics include: Venipuncture, complete blood counts (CBCs), hemopoietic theory, erythrocyte metabolism and hemoglobin synthesis, introduction to erythrocyte dyscrasias including anemias of various disease etiologies, hemoglobinopathies, and thalassemias. Leukocyte topics include: Leukopoiesis, FAB classifications of leukemias, leukocyte dyscrasias of various etiologies, and lymphomas of various origins. Laboratory sessions included.

5.00, Class & Lab | Web Component

CLS-511 Hematology II

This course is designed to introduce basic concepts in coagulation and hemostasis. Topics include: megakaryopoiesis, hemostasis and coagulation, description and definitions of various coagulopathies of known and unknown etiologies. Prerequisite:

Departmental permission.

2.00, Classroom | Web Component

CLS-512 Body Fluid Analysis

Analysis of various body fluids with emphasis on the theory and practice of clinical procedures. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates and exudates. Laboratory component included.

4.00, Class & Lab | Web Component

CLS-513 Hematology Case Studies

Review of erythrocyte, leukocyte, and coagulation disorders through the use of case studies. Critical thinking is used to analyze patient histories, clinical symptoms, and significant laboratory findings. Prerequisite: CLS 311/511.

2.00, Online Only

CLS-517 Advanced Hematology I

This course consists of a review of hematologic concepts followed by a comprehensive evaluation and additional advanced theory in clinical hematology including hematopoiesis, development, metabolism, kinetics, and function of red cells, white cells, and platelets and associated hematologic disorders.

3.00, Online Only

CLS-519 Advanced Body Fluid Analysis

This course consists of a review of concepts in urinalysis and body fluid analysis followed by a comprehensive evaluation and additional advanced theory. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates, and exudates.

3.00, Online Only

CLS-520 Clinical Immunohematology

Blood group antigens and antibodies from the discoveries of Landsteiner in 1900 to the present day are studied. Blood banking procedures involved in drawing, testing, storing, and transfusing whole blood and its components are discussed. The laboratory section will deal with the basic blood bank procedures including ABO grouping, RH typing, compatibility testing and special antibody studies. Prerequisite: Departmental Permission.

5.00, Class & Lab | Web Component

CLS-521 Clinical Immunology

An introduction to the basic concepts and terminology of immunity including development, structure and function of the

lymphoid systems; the basis of antigenicity; antibody structure; methods of detection and measurement; mechanism of cellular immunity; white cell function; hypersensitivity reactions; the complement system; and mechanisms of immune suppression and tolerance. In the laboratory portion of the class, students become familiar with the purpose, principles, performance and interpretation of various serological tests used routinely in the clinical laboratory for the diagnosis of syphilis and other infectious diseases, as well as, autoimmune diseases such as rheumatoid arthritis and thyroiditis. Prerequisite: Departmental permission.

4.00, Class & Lab | Web Component

CLS-522 Clinical Immunology II

A continuation of CLS 321/521. Topics include the immune response and the laboratory testing related to measuring the immune response. The pathogenesis and laboratory diagnosis of immunological disorders such as hypersensitivities, immune deficiencies, and autoimmunity. Developing and solving case studies involving immune disorders will be an important aspect of learning about these diseases.

2.00, Classroom | Web Component

CLS-530 Clinical Microbiology

Course focuses on the diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Laboratory activities familiarize the student with the colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays. These activities are then applied to the identification of unknown bacterial isolates found in patient specimens.

5.00, Class & Lab | Web Component

CLS-531 Parasitology Mycology & Virology

This course provides clinical background in mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. The laboratory portion consists of identification, specimen collection and processing of medically important viruses, fungi and parasites.

4.00, Class & Lab | Web Component

CLS-532 Infectious Disease Case Studies

This course will provide the student with the opportunity to analyze patient laboratory information in order to diagnose the infectious disease. The student will analyze prepared case studies and answer questions regarding the case and the causative

agent in the form of homework assignments, class discussions and by composing their own case study with information from the literature, textbooks, and the Internet.

2.00, Online Only

CLS-533 Molecular Techniques

The molecular biology course consists of an introduction to the principles, methodologies and applications of molecular biological procedures used in the clinical laboratories. Emphasis is placed on the molecular biological procedures used in the identification of infectious agents that cause human disease and in the detection of mutations resulting in neoplasm or congenital disorders. Laboratory component included. Prerequisite: Departmental permission.

4.00, Class & Lab | Web Component

CLS-538 Advanced Microbiology

This course consists of a review of clinical microbiology concepts followed by a comprehensive evaluation and additional advanced theory in clinical microbiology including diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Includes laboratory experiences dealing with diagnostic tests performed in a clinical activities familiarize the student with the colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays.

3.00, Online Only

CLS-539 Advanced Parasitology Mycology Virology

This course consists of a review of clinical concepts followed by a comprehensive evaluation and additional advanced theory in clinical mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. Includes laboratory experiences dealing with diagnostic tests and identification, specimen collection and processing of medically important viruses, fungi and parasites.

3.00, Online Only

CLS-540 Clinical Lab Science Seminar I

This course is designed as a research seminar during which students and faculty present clinical laboratory science research topics for discussion. Various research designs, sampling techniques and data analysis methods are discussed. Prerequisite: Departmental Permission.

2.00, Classroom | Web Component

CLS-544 Professional Development I

Course introduces the student to the profession of clinical laboratory science. The various professional, accrediting and certifying organizations are discussed. Students learn about the profession from experienced clinical laboratory scientists. The past, present and future of the profession are discussed including present and future trends in education and employment.

1.00, Classroom | Web Component

CLS-545 Professional Development II

Course focus is on professional issues, professional conduct and ethics. Students discuss various trends and factors that affect the profession. An in-depth series of ethical issues and behavior are presented and analyzed. Scientific integrity and responsible conduct are discussed.

1.00, Classroom

CLS-546 Professional Development III

Students participate in professional enrichment projects. These projects are divided up into five areas which reflect the mission of Rush University Medical Center. These areas are: patient care, education, research, personal development and community health. The student will complete the assigned project as well as one of the elective projects. Prerequisite: Departmental permission. P/N grading.

1.00, Classroom

CLS-547 Professional Development IV

Course involves participation in a professional enrichment project. Projects include, but are not limited to, the following: practical experience at alternate sites in which Clinical Laboratory Scientists work, e.g. local clinics, health centers, nursing homes, research facilities, various industrial firms, and/or community hospitals; community activities such as presenting information sessions to senior citizen groups, various professional groups or at local association and club meetings; participation in the development of science fair projects and science fair judging at local area schools; areas of special research interests; other areas chosen for their enrichment potential.

1.00, Classroom

CLS-548 Professional Development V

Course involves various professional guest speakers from alternate sites in which Clinical Laboratory Scientists work, i.e. industrial firms, specialty hospitals, research facilities, etc. The professional will present to the students about their specific job, relating it to clinical laboratory sciences. The purpose of these sessions is to inform the students of multiple professional opportunities for Clinical laboratory sciences in addition to working in a traditional hospital laboratory.

1.00, Classroom

CLS-550 Lab Information & Automation Systems

Presents an overview of total laboratory automation systems (TLA) and clinical laboratory information systems (LIS) including system functionality, selection, installation, validation, maintenance, security and interfaces. Topics include the electronic health record (EHR) and clinical information systems that interface with the LIS. The purpose of selected hardware, the operating system and specialized software will be reviewed.

2.00, Classroom | Web Component

CLS-551 Quality Issues in Clinical Lab Science

This course presents methods and strategies to ensure quality testing in all types of laboratory settings including point of care testing (POCT) and physicians' office laboratories (POLs). Topics include quality assurance, proficiency testing, method evaluation, establishing reference values and predictive value statistics. Common POCT devices will be described and students will learn how laboratory professionals ensure the competency of individuals performing POCT. The regulatory bodies involved in these processes will be introduced.

2.00, Classroom | Web Component

CLS-552 Regulatory Issues

Covers the history and impact of government and private controls on the quality and accessibility of laboratory services. Topics include: OSHA, HIPAA, test reimbursement, direct access testing, professional certification, licensure, unionization, and educational program accreditation. Students will examine proposed state and federal legislation and learn ways to influence passage of good laboratory-related law. The professional/public image of the CLS profession will also be discussed.

2.00, Classroom | Web Component

CLS-553 Communications

Interpersonal and organizational communication techniques for creating effective communication with subordinates, peers and managers. Consultation and project management techniques will be included.

2.00, Classroom | Web Component

CLS-555 Lab Supervision & Education

Fundamentals of management and supervision including human resource management, finance and reimbursement, quality assessment and improvement, leadership, communication, and decision making/judgment skills will be emphasized. Interactive sessions employing problem based learning techniques help the student understand important leadership and management concepts. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

CLS-556 Clinical Laboratory Management

Management of the clinical laboratory will be covered in this course with topics to include: operational aspects of the laboratory, human resource management, financial considerations of running a laboratory, error management, personality and leadership styles, and crisis and disaster management. Students will participate in interactive sessions designed to help them understand and develop important leadership and management concepts. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

CLS-558 Marketing and Negotiation

Vendor relations, contract negotiations, product cost analysis and marketing strategies will be discussed. Students will have the opportunity to become involved in actual contract negotiations and marketing of laboratory services.

4.00, Classroom

CLS-559 Issues in Pathology

Continuation of CLS 448/548

4.00, Classroom

CLS-560 Research Seminar I

This course is designed to provide an introduction to various research methods ranging from the highly quantitative to broad qualitative approaches. Formulation of the research hypotheses, or questions, ethical issues, literature search techniques, the writing of the research proposal/final research report and the dissemination of research findings are discussed. Statistics and interpretation of research findings are included. This course is designed to provide the first-time researcher with the skills to undertake research in areas of their choice.

2.00, Classroom

CLS-561 Research Seminar II

Continuation of CLS 460/560. Additional statistical measures used in research data analysis are presented and discussed. Students are expected to present research articles in the field of clinical laboratory science for discussion and critique. Current researchers in various areas related to clinical laboratory science present their research designs as examples of how to plan and conduct research. Students will be introduced to the institutional IRB requirements and will complete the on-line training module on preparing for an IRB review. Ethical issues in health care related research, conflicts of interest, intellectual property issues, authorship and collaboration will be discussed.

2.00, Classroom

CLS-562 Research Seminar III

Continuation of CLS 461/561. This course is tutorial based. Students work with their major advisor and project committee members to complete their master's project for final defense. P/N grading. Prerequisite: Departmental permission.

1.00-2.00, Online Only

CLS-563 Master's Project I

First part in planning and conducting the required master's degree research project. Students are expected to begin formulation of their research questions and to complete their review of the literature. Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results.

2.00, Online Only

CLS-564 Master's Project II

Continuation of CLS 563 At the completion of this course the student should be ready to present their research proposal to their committee for the preliminary defense and to begin and complete the data collection phase of their research. Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results.

2.00, Online Only

CLS-565 Master's Project III

Continuation of CLS 564. During this phase, the research report is completed and the final defense of the project takes place. Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results.

2.00, Online Only

CLS-567 Comprehensive Review

A comprehensive review of Hematology, Body Fluids, Clinical Chemistry, Laboratory Mathematics, Immunology, Immunohematology, Molecular Diagnostics, and Microbiology. This review course prepares students for the national certification examinations. At the completion of the review all student take a comprehensive examination. Successful passing of all sections of the comprehensive examination is required for completion of the course and for graduation.

2.00, Online Only

CLS-570 Clinical Practicum-Chemistry

The practicum builds upon the theoretical knowledge and techniques learned during year one in the CLS clinical chemistry laboratory and lecture courses. The rotation is designed to introduce students to the working environment of a clinical chemistry laboratory and provide opportunities for students to work with state of the art chemistry instrumentation and techniques.

4.00, Practicum | Web Component

CLS-571 Clinical Practicum-Hematology

Course includes application of basic skills learned in Hematology course work. This is a clinical rotation through the hospital hematology laboratory. Basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies, special hematologic testing techniques, bone marrow techniques, and coagulation are included.

4.00, Practicum | Web Component

CLS-572 Clinical Practicum-Microbiology I

Rotation through the clinical bacteriology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Practicum | Web Component

CLS-573 Clinical Practicum-Microbiology II

Rotation through the specialty laboratory laboratories of clinical microbiology including parasitology, anaerobes, mycobacteriology, mycology and virology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Practicum | Web Component

CLS-574 Clinical Practicum-Immunohematology

Rotation through the hospital blood bank laboratory. Applications of basic skills learned in student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Practicum | Web Component

CLS-575 Clinical Practice Immunology/Molecular Diagnostics

Rotation through clinical immunology and molecular diagnostic laboratories. Applications of basic skills learned in the student laboratory are practiced. Areas included are serology, histocompatibility typing, flow cytometry, karyotyping, molecular oncology, nucleic acid amplification, DNA sequencing, FISH probe analysis and other diagnostic procedures.

4.00, Practicum | Web Component

CLS-576 Clinical Practicum-Education

Students will assist in the instruction of the student laboratory sessions. They will work with the course director in the preparation and execution of laboratory experiments by first year students. Educational principles and curriculum planning skills will be learned through online discussions and exercises.

4.00, Practicum | Web Component

CLS-578 Patient Care Techniques

Techniques of specimen collection and phlebotomy are discussed and practiced. Students will perform a minimum of 50 venipuncture procedures on in-house patients throughout the various areas of the hospital and in the outpatient clinics. Pediatric and geriatric patients are included, as are general adult population patients. Procedures for specimen processing and ordering are learned. Procedures for specimen collection and handling with an emphasis pre-analytical situations, documentation, transportation requirements and infection control are covered in this course. Students will also learn about basic phlebotomy equipment and techniques involved in specimen collection, including venipuncture and capillary collection procedures on adult and children populations.

2.00, Practicum | Web Component

CLS-580 Human Blood Group Systems

Focus on human blood group systems; biochemistry, inheritance, serologic activity, clinical significance and disease associations. Topics include, but are not limited to, fundamentals of immunology, molecular biology, red blood cell membrane structure, and genetics as they relate to blood group systems. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor.

4.00, Online Only

CLS-581 Principles & Methods of ABID

Review of methods for the detection and identification of antibodies with specificity for human red cell antigens. Topics include, but are not limited to, history of transfusion medicine, serological systems, direct and indirect antiglobulin tests. Focus on resolution of complex antibody problems. Taught only online. Extensive computer use required.

2.00, Online Only

CLS-582 Blood Procurement/Blood Product Manufacturing

Focus on theoretical and practical concepts used in blood procurement and product manufacturing. Topics include, but are not limited to, physiology, composition, & function of blood, blood donor suitability, collection, serological testing, transfusion

infectious diseases & their testing, component preparation, labeling, storage, and distribution. Taught only online. Extensive computer use required.

3.00, Online Only

CLS-583 Blood Bank/Transfusion Service

Review of theoretical and practical concepts used in blood bank and transfusion service operation. Topics include, but are not limited to, safety and federal regulatory requirements, pre-transfusion testing, administration of blood components. Focus on quality management systems; QC, QA, QM, blood utilization management, error management. Taught only online. Extensive computer use required.

3.00, Online Only

CLS-584 Clinical Immunohematology/Transfusion

Focus on transfusion medicine practice and therapy. Topics include, but are not limited to, human circulatory system, effects of shock, blood component therapy, special transfusion, perinatal, neonatal & pediatric transfusion practice, hemolytic disease of the newborn, transplantation, anemias, infectious and noninfectious complications of blood transfusion. Taught only online. Extensive computer use required.

4.00, Online Only

CLS-585 Selected Topics & Comprehensive Review

Advanced study of current trends; assigned topics in current literature read, evaluated and discussed. Topics include, but are not limited to, basics of research and education, information systems in blood bank, parentage testing, medical-legal, and ethical aspects of blood banking, and laboratory math for the blood banker. A comprehensive review and exam is provided for students completing the SBB program and eligible to sit for the ASCP SBB certification examination. Taught only online. Extensive computer use required.

3.00, Online Only

CLS-586 Specialist in Blood Bank Clinical Practicum

Field experience under supervision of a professional expert in a blood center and/or hospital transfusion service setting. Students enrolled in the SBB Traditional curriculum must participate in clinical site visits and serologic resolution of clinical specimens. Students must take a minimum of four quarter hours within four quarters. It is recommended that the student take no more than four quarter hours within any given quarter. Clinical sites include, but are not limited to, apheresis centers, donor centers, stem cell processing centers, and transfusion service centers.

4.00, Online Only

CLS-587 Specialist in Blood Bank Project

Independent investigation of a topic relevant to an area in immunohematology. Student submits a written research paper as well as prepares and delivers a presentation based on the topic selected. Students enrolled in the SBB Traditional curriculum must participate in a research project and develop a presentation for a professional audience. Students must take a minimum of three quarter hours within four quarters. It is recommended that the student take no more than three quarter hours within any given quarter.

1.00, Online Only

CLS-596 Quality Systems & Regulatory Issues

The complexity of operating a clinical laboratory requires an in depth knowledge of quality systems as well as knowledge of the regulatory requirements at both national and local levels. Laboratory managers will need to understand the principles of the quality system essentials (QSE) and be able to implement a quality management system (QMS). This course is designed to provide a web-based learning approach to teaching the principles of quality management and laboratory regulation. The focus is to present the twelve quality system essential concepts, which are the building blocks of the QMS, to introduce the path of workflow within the laboratory and how to establish a quality management system. The learner will be assisted in the successful application of this information to real-life situations. Book chapters, articles from professional journals, Internet references and website resources permit the learner to acquire advanced and current information in each of the major topic areas. Learning units are organized to cover the twelve quality system essentials and an overview of clinical laboratory regulation.

4.00, Online Only

CLS-900G Independent Study-Graduate

Requires departmental permission. [v-v-v]

1.00-12.00, Independent Study

CLS-900U Independent Study-Undergraduate

Requires departmental permission. [v-v-v]

1.00-12.00, Independent Study

CLS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are

graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

CRE-523 Readings in Clinical Research

This course consists of seminars evaluating clinical research studies in the literature. Each seminar will evaluate a clinical study, its attributes, as well as the methodological problems. Many of the studies discussed will have been undertaken by Rush Clinical Investigators and one of the investigators will lead the discussion.

2.00-4.00, Classroom

CRE-523 Readings in Clinical Research

This course consists of seminars evaluating clinical research studies in the literature. Each seminar will evaluate a clinical study, its attributes, as well as the methodological problems. Many of the studies discussed will have been undertaken by Rush Clinical Investigators and one of the investigators will lead the discussion.

1.00, Classroom | Web Component

CRE-557 Clinical Trials I

Presents an overview of all types of trial designs including large simple trials, randomized double blinded trials, crossover studies and others. The course applies concepts obtained in Basic and Observational Epidemiology courses to address how studies are set up to answer specific research questions. The course reviews experimental designs in the context of specific hypotheses, bias, and confounding. Publications from existing peer-review journals will be used to illustrate various trial designs.

3.00, Classroom

CRE-557 Clinical Trials I

Presents an overview of all types of trial designs including large simple trials, randomized double blinded trials, crossover studies and others. The course applies concepts obtained in Basic and Observational Epidemiology courses to address how studies are set up to answer specific research questions. The course reviews experimental designs in the context of specific hypotheses, bias, and confounding. Publications from existing peer-review journals will be used to illustrate various trial designs.

2.00, Classroom

CRE-558 Clinical Trials II

This course focuses on practical application of the concepts learned in Clinical Trials I. Trainees will be expected to design various types of clinical trials e.g. multicenter, double blind, placebo controlled studies as well as large simple trials and describe rationale for blinding, methods of randomization and

planned analysis. Issues of data interpretation will be covered. Prerequisite: CRE-557.

3.00, Classroom

CRE-558 Clinical Trials II

This course focuses on practical application of the concepts learned in Clinical Trials I. Trainees will be expected to design various types of clinical trials e.g. multicenter, double blind, placebo controlled studies as well as large simple trials and describe rationale for blinding, methods of randomization and planned analysis. Issues of data interpretation will be covered. Prerequisite: CRE-557.

2.00, Classroom

CRE-559 Readings in Special Populations

This course covers issues relating in doing clinical research with Special Populations. The course is a seminar discussion of these issues, when research is undertaken in populations of prisoners, the elderly, the mentally retarded, emergency situations, minority groups, as well as other groups considered special populations.

2.00, Classroom

CRE-559 Readings in Special Populations

This course consists of seminars evaluating clinical research studies in the literature. Each seminar will evaluate a clinical study, its attributes and the methodological problems. Many of the studies discussed will have been undertaken by Rush clinical investigators, and one of the investigators will lead the discussion.

1.00, Classroom | Web Component

CRE-597 Thesis Research

For trainees doing thesis research or writing. Prerequisite: Consent of the trainee's advisor; and acceptance of the thesis topic and preliminary thesis outline by the thesis committee. A minimum of 6 hours is required. P/N grading only.

1.00-12.00, Classroom

CRE-597 Thesis Research

For a students in the Master of Science in Clinical Research program to undertake thesis research. Participation requires a research mentor.

1.00-9.00, Laboratory

CRE-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-9.00, Independent Study

CRE-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

DRM-716 Dermatology

Dermatologic problems are studied under the direct supervision of the departmental faculty; diseases are considered from the standpoint of etiology, pathogenesis, diagnosis, course, and treatment. Clinical and histopathologic correlations are emphasized. Skin therapeutics is taught stressing biochemical and physiological considerations. There is a written final examination based on assigned reading. Prerequisite: Fourth year status. Third year students may take this elective only in May/June of their M3 year.

4.00, Clinical | Web Component

DRM-716X Dermatology-Away

Dermatological problems are studied under the direct supervision of the departmental staff; diseases are considered from the standpoint of etiology, pathogenesis, diagnosis, and histopathology. Skin therapeutics are taught, stressing biochemical and physiological considerations. Prerequisite: fourth year status.

4.00, Clinical

DRM-781 Research in Dermatology

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Director of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. Fourth year medical students only.

4.00, Clinical

DRM-7EI Dermatology Individualized Elective

Students may receive credit for individually arranged activities with Rush faculty members, outside faculty personal, private physicians or researchers, or persons in medically related field such as medical historians, ethicists, attorneys, and medical journalists. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, specific dates of the rotation and that the student will not receive any monetary compensation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Director of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

4.00, Classroom

EMD-703 Core Clerkship: Emergency Medicine

Students will be primarily responsible for the clinical management and documentation of patients. This will include performing an initial and any subsequent assessments, ordering and interpreting any diagnostic workup, discussing the case with any consultants or admitting teams. Emphasis is placed on the student learning how to perform a focused evaluation of an undifferentiated patient, particularly the formation of a differential diagnosis and strengthening clinical decision making skills.

4.00, Clinical

EMD-715 Emergency Medicine

Students will see patients in all areas of the Emergency Room under the supervision of an attending physician. They will be expected to take a complaint-oriented history, with attention to pertinent past medical history, and perform a pertinent physical exam. They will record their findings and discuss the patient with the attending. Together they will formulate a diagnostic plan, bearing in mind time and cost factors and priorities inherent in various diagnostic possibilities.

4.00, Clinical

EMD-716 Emergency Medicine

Students will evaluate adult and pediatric patients in the Emergency Room under the supervision of an attending physician. Fourteen eight-hour shifts are required over the four-week block. There will be at least two weekend shifts, two night shifts, and two evening shifts (actual scheduling will take place at orientation). Grading is based on clinical performance, participation in didactic sessions, a presentation at the end of the

rotation, and an oral exam. NOTE: M3s who have completed all core clerkships may be able to enroll in this clerkship. Please contact the Office of Medical Student Programs for information.
4.00, Classroom

EMD-717 Disaster Medicine

All activities will be conducted online through the use of web-based study modules, discussion forums, and internet chat. Through the use of online modules, the students will be exposed to the concepts of managing a disaster scene (triage, incident command structure and performing a hazard vulnerability analysis). Students will together complete a hazard vulnerability analysis project (through a discussion forum). Fundamental disaster medicine concepts regarding Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE injuries), in addition to natural disasters and psycho-behavioral implications of such events, will also be completed online. Each module will be followed by a short quiz to test comprehension. A final exam including a specific disaster scenario (presented online) will also be administered. Upon completion of this rotation, the student will be able to: 1. Describe the fundamental concepts of Hospital Incident Command System (HICS) 2. Differentiate the various categories underlying triage in disaster situations 3. Apply the concepts of Hazard Vulnerability Analysis 4. Describe the essential elements behind Chemical Biological Radiological, Nuclear, Explosive (CBRNE), and natural disasters 5. Explain the essential psycho-behavioral implications of disasters
2.00, Classroom

EMD-722 Pediatric Emergency Medicine

Four 10-hour shifts per week are spent evaluating patients in the Emergency Room under the supervision of an attending physician. Evening and weekend shifts are included. The student is required to attend teaching conferences in the Emergency Department and to present an informal lecture on a pediatric emergency medicine topic.
4.00, Clinical

EMD-781 Research in Emergency Medicine

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Director of Clinical Curriculum before beginning the

rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

EMD-815 Emergency Medicine

Students will see patients in all areas of the Emergency Room under the supervision of an attending physician. They will be expected to take a complaint-oriented history, with attention to pertinent past medical history, and perform a pertinent physical exam. They will record their findings and discuss the patient with the attending. Together they will formulate a diagnostic plan, bearing in mind time and cost factors and priorities inherent in various diagnostic possibilities.

4.00, Clinical

EMD-822 Pediatric Emergency Medicine

Five 8-hour shifts per week are spent evaluating patients in the Emergency Room under the supervision of an attending physician. Evening and weekend shifts may be included. Students are required to attend the Pediatric Department noon case conference.

4.00, Clinical

EMD-830 Medical Toxicology/ Poison Control

The Toxicology elective will introduce the student to the nature and scope of poisoning. The Illinois Poison Center covers the entire state of Illinois and handles 90,000-100,000 calls per year from individuals and healthcare facilities. The goal for the medical student on the toxicology elective is to develop a basic understanding on acute poisonings. In addition the student will be knowledgeable about the public health role of the Poison control Center and Medical Toxicologists in managing poisons throughout the state, and it's interface with the public and health care facilities.

2.00, Classroom

EMD-831 Emergency Ultrasound

This elective will provide M4 students with an introduction to Emergency Ultrasound as well as an inside look into Emergency Medicine. Students will be evaluated across core competencies based on interactions with patients, total number of scans, accuracy and participate in didactics, journal clubs, image review sessions and research meetings. Students will determine when an emergency ultrasound exam is indicated, discuss the examination with the patients and obtain informed consent, obtain US

images, interpret US images and work with primary clinical staff to integrate US findings into patient management.

2.00, Classroom

EMD-EXM Emergency Medical - Exam Remediation

Remediation of core Emergency Medicine exam only.

4.00, RMC Exam Makeup

FAM-701 Core Clerkship in Family Medicine

The Family Medicine core clerkship is an intense ambulatory experience. Students are allowed to see patients initially and formulate their assessments and plans under supervision of senior residents and attendings. Participation in comprehensive, longitudinal care is stressed. The common problems and responsibilities of a primary care physician are observed and taught. A lecture series and text supplement the clinical experience.

4.00, Clinical | Web Component

FAM-705 Elective - Family Medical Leader Track

The Family Medicine Leadership Track (FMLT) will be designed as a four-year, longitudinal curriculum designed to help meet the health needs of the population by training a select group of primary care focused medical students to become family medicine providers, mentors and leaders. The curriculum will emphasize patient-centered, community-based, interdisciplinary and experiential learning, with leadership development throughout the full four years of the undergraduate medical education. Students will be assigned to outpatient practices that will serve as their longitudinal "home base" for their entire medical school experience. They will be supervised by family medicine faculty mentors and become an integral part of the community-based care team, gaining an appreciation for continuity of care by following their own panel of patients over time, observing the course of illness and recovery. The students will also participate in extracurricular activities and learning activities that emphasize the patient-centered medical home, promote community service and scholarly pursuits, requiring independent study and self-directed learning, allowing for significant personal and professional growth.

1.00, Clinical | Web Component

FAM-710 Family Medicine Subinternship

An intensive inpatient primary care experience at Rush Copley. The subintern will function in a capacity similar to an intern, with supervision by a senior Family Medicine resident and faculty physician.

4.00, Clinical

FAM-725 Alcohol/Chemical Dependency Unit

During this two- to four-week clerkship students develop skills in interviewing and managing alcoholic and other chemically

dependent patients. A longitudinal interdisciplinary experience is stressed, emphasizing detoxification, rehabilitation, and outpatient treatment.

2.00-4.00, Clinical

FAM-735 Primary Care Sports Medicine

The focus of this elective will be on outpatient management of acute and chronic sports and exercise-related injuries and medical issues pertinent to athletes in a multidisciplinary setting. Emphasis will be placed on the diagnosis and treatment of musculoskeletal problems common to athletes. In the context of sports medicine, the student will get exposure and improve proficiency in musculoskeletal physical examination, imaging (such as plain films, MRIs, and bone scans); biomechanics; physical therapy, physiology and metabolism; nutrition; and sports psychology. In addition to the clinical issues, the philosophy of primary care sports medicine will be explored, and the aspects of prevention in sports medicine will be highlighted. Students must make arrangements for this clerkship with Dr. Cynthia Waickus. Credit for this course will apply toward the 8 weeks' maximum credit in the "orthopedics" subspecialty.

4.00, Clinical

FAM-741 Urban Primary Care

An advanced preceptorship with three family physicians in an urban practice. Students are expected to initiate and complete a research or quality improvement project focusing on preventive health services or the enhancement of access to medical care for minority communities.

4.00, Clinical

FAM-741 Urban Primary Care

An advanced preceptorship with three family physicians in an urban practice. Students are expected to initiate and complete a research or quality improvement project focusing on preventive health services or the enhancement of access to medical care for minority communities. Prerequisites: FAM 701, MED 701, PED 701, OBG 703. FA WI SP SU [4 weeks]

4.00, Clinical

FAM-741X Urban Primary Care-Away

An advanced preceptorship with three family physicians in an urban practice. Students are expected to initiate and complete a research or quality improvement project focusing on preventive health services or the enhancement of access to medical care for minority communities. This rotation must be pre-arranged at least four weeks in advance with the course director.

Prerequisites: FAM 701, MED 701, PED 701, OBG 701.

4.00, Clinical

FAM-745 Private Practice Preceptorship

A preceptorship with an experienced family physician, both at the office and in the hospital. The student will work in all areas of a busy physician's practice. Multiple sites in Chicago and suburbs are available.

4.00, Clinical

FAM-751 Rural Primary Care

This rotation is a preceptorship with an experienced family physician in Streator, Illinois, a town of 15,000 persons ninety miles southwest of Chicago. Housing for the student must be arranged in advance through Dr. Warzo. Student is responsible for his own living expenses.

2.00, Clinical

FAM-761 Principle and Practice of Wound Care

The wound care elective is designed to introduce the student to the multidisciplinary approach used in the management of chronic wounds, including the evaluation and treatment of these wounds in the context of underlying complex medical conditions (such as diabetes mellitus, renal failure, osteomyelitis, arterial insufficiency, spinal cord injuries, peripheral vascular insufficiency, and resistant infections). Students will be introduced to new developments in the field of wound care (platelet derived GF, skin grafting, vacuum assisted closure, compression pumps/wraps, etc.). Since the patients return to the clinic on a weekly basis for ongoing treatment, students will have the opportunity to participate in continuity of care, and observe the wound healing.

2.00, Clinical

FAM-781 Research in Family Medicine

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

FAM-7EI Family Medicine Elective

Students may receive credit for an individually arranged elective with a Rush faculty members. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

Elective

4.00, Clinical

FAM-EXM Family Medicine Exam Remediation

Core family medicine examination remediation only.

4.00, Clinical

FAM-REM Family Medicine Clinical Remediation

Clinical remediation of core family medicine - repeat of exam is not required. Clinical site determined by the course director.

4.00, Clinical

GCC-500 Topics in Cellular Biochemistry: Metabolism

Additional topics in Cellular Biochemistry. Expanded lectures on Concepts of cellular biochemistry, which underlie the structure, organization and communication of cells, will be presented. Protein, carbohydrate and lipid structure and function in cellular organization will be covered. Special emphasis will be placed on the roles of enzymes, signaling systems, receptors and membrane transport systems in cell function. This section will also overview neurons, synapses and neurotransmitters.

1.00, Classroom | Web Component

GCC-501 Molecular Biology: Genome/Proteome

DNA structure, replication, recombination, cloning, sequencing and related topics will be covered. This course will continue with organization of the human genome, the cell cycle, genetic mapping and relationships between genes and diseases. Transcriptional and translational regulations will be included.

3.00, Classroom | Web Component

GCC-501 Molecular Biology/Human Genetics

DNA structure, replication, recombination, cloning, sequencing and related topics will be covered. This course will continue with organization of the human genome, the cell cycle, genetic

mapping and relationships between genes and diseases. Transcriptional and translational regulations will be included.
3.00, Classroom | Web Component

GCC-501 Molecular Biology: Genome/Proteome

DNA structure, replication, recombination, cloning, sequencing and related topics will be covered. This course will continue with organization of the human genome, the cell cycle, genetic mapping and relationships between genes and diseases. Transcriptional and translational regulations will be included.
2.00, Classroom | Web Component

GCC-502 Cell Biochemistry: Proteins/Transport/Signaling

Concepts of cellular biochemistry which underly the structure, organization and communication of cells will be presented. Protein, carbohydrate and lipid structure and function in cellular organization will be covered. Special emphasis will be placed on the roles of enzymes, signaling systems, receptors and membrane transport systems in cell function. This section will also overview neurons, synapses and neurotransmitters.
3.00, Classroom | Web Component

GCC-502 Cell Biochemistry: Proteins,Transport,Signaling

Concepts of cellular biochemistry which underlie the structure, organization and communication of cells will be presented. Protein, carbohydrate and lipid structure and function in cellular organization will be covered. Special emphasis will be placed on the roles of enzymes, signaling systems, receptors and membrane transport systems in cell function. This section will also overview neurons, synapses and neurotransmitters.
2.00, Classroom | Web Component

GCC-503 Functional Cell Biology

The major concepts of cell structure and function will be covered. Topics include tissue origin and organization, extracellular matrix, cytoskeleton, cell-cell adhesion, organelles and compartments, endocytosis, exocytosis, metabolic requirements for signal transduction, cell motility, and regulation of cell proliferation.
2.00, Classroom | Web Component

GCC-503 Functional Cell Biology

The major concepts of cell structure and function will be covered. Topics include tissue origin and organization, extracellular matrix, cytoskeleton, cell-cell adhesion, organelles and compartments, endocytosis, exocytosis, metabolic requirements for signal transduction, cell motility, and regulation of cell proliferation.
1.00, Classroom | Web Component

GCC-504 Functional Tissue Biology

The biochemical and cellular basis for tissue structure and

function will be covered. Topics include systems histology and anatomy, immunity, tissue injury and repair/regeneration, regulation of cell-cell adhesion, apoptosis, endocrinology, pharmacology, and toxicology.
3.00, Classroom | Web Component

GCC-504 Functional Tissue Biology

The biochemical and cellular basis for tissue structure and function will be covered. Topics include systems histology and anatomy, immunity, tissue injury and repair/regeneration, regulation of cell-cell adhesion, apoptosis, endocrinology, pharmacology, and toxicology.
2.00, Classroom | Web Component

GCC-505 Techniques in Biomedical Science

This course will provide a didactic overview and a demonstration of certain laboratory techniques. Topics include electrophoresis, genomics, PCR, tissue culture, cell-sorting techniques, ELISA, chromatography/LC mass spectrometry, imaging techniques, histochemistry, and microscopy.
2.00, Classroom | Web Component

GCC-505 Techniques in Biomedical Science

This laboratory course will provide a didactic overview and a demonstration of certain laboratory techniques. Topics include electrophoresis, genomics, PCR, tissue culture, cell-sorting techniques, ELISA, chromatography/LC mass spectrometry, imaging techniques, histochemistry and microscopy.
1.00, Classroom | Web Component

GCC-505 Techniques in Biomedical Sciences

The first portion of this course will introduce students to the laboratories and share a deeper look into the research opportunities available at Rush. The laboratory portion of the course will provide a didactic overview and a demonstration of certain laboratory techniques. Topics include electrophoresis, genomics, PCR, tissue culture, cell-sorting techniques, ELISA, chromatography/LC mass spectrometry, imaging techniques, histochemistry and microscopy.
1.00, Classroom | Web Component | Laboratory

GCC-506 Biomedical Ethics

The major issues of honesty and fairness as practiced in the scholarly pursuit of new knowledge will be reviewed. Topics include equal opportunity and non-discrimination, abusive relationships, student-faculty relationships, responsibilities of students, faculty, chairpersons and administrators, honesty in writing, authorship, and ownership of data.
1.00, Classroom | Web Component

GCC-507 Medical Research Strategies/Statistics

This is an introduction to study design and hypothesis testing. Topics include data definition, study design, probability theory, confidence intervals, hypothesis testing, and the techniques used in modern biostatistics.

2.00, Classroom | Web Component

GCC-507 Biomedical Statistics

This is an introduction to study design and hypothesis testing. Topics include data definition, study design, probability theory, confidence intervals, hypothesis testing, and the techniques used in modern biostatistics.

2.00, Classroom | Web Component

GCC-508 Writing Practicum

This is a hands-on writing course which focuses on the requirements for abstract, manuscript and grant application writing. Topics include abstract writing, manuscript writing and grant writing. Each topic is covered in several sub-components.

2.00, Classroom | Web Component

GCC-511 Readings in Molecular Biology

Journal Club course that covers topics related to GCC-501.

1.00, Classroom | Web Component

GCC-512 Readings in Cellular Biochemistry

Journal Club course that covers topics related to GCC-502.

1.00, Classroom | Web Component

GCC-513 Readings in Functional Cell Biology

Journal Club course that covers topics related to GCC-503.

1.00, Classroom | Web Component

GCC-514 Readings in Functional Tissue Biology

Journal Club course that covers topics related to GCC-504.

1.00, Classroom | Web Component

GCC-520 Introduction to Pharmacology & Physiology I

The GCC-520 and 521 course series integrates physiology and pharmacology to establish an understanding of drug actions as they relate to human organ system function. Topics include cellular function, immunity and infection, synapse, nerve, muscle, heart and circulation, kidney, respiration, gastrointestinal and urinary function, autonomic nervous system, central nervous system, hormones and homeostasis, and coagulation. The course sequence runs fall through spring.

3.00, Classroom | Web Component

GCC-521 Introduction to Pharmacology & Physiology II

The GCC-520 and 521 course series integrates physiology and pharmacology to establish an understanding of drug actions as

they relate to human organ system function. Topics include cellular function, immunity and infection, synapse, nerve, muscle, heart and circulation, kidney, respiration, gastrointestinal and urinary function, autonomic nervous system, central nervous system, hormones and homeostasis, and coagulation. The course sequence runs fall through spring.

3.00, Classroom | Web Component

GCC-522 Introduction to Pharmacology & Physiology III

Continuation of topics included in GCC-520, 521

3.00, Classroom | Web Component

GCC-529 Introduction to the Laboratory

This course will introduce students to the laboratories and share a deeper look into the research opportunities available at Rush.

1.00-9.00, Laboratory | Web Component

GCC-530 Laboratory Rotations

Hands-on experience in a laboratory to provide the student with an understanding of laboratory interests and learn research protocols. Repeatable for exposure in different labs.

1.00-9.00, Laboratory | Web Component

GCC-54 Functional Tissue Biology

The biochemical and cellular basis for tissue structure and function will be covered. Topics include systems histology and anatomy, immunity, tissue injury and repair/regeneration, regulation of cell-cell adhesion, apoptosis, endocrinology, pharmacology, and toxicology.

3.00, Classroom | Web Component

GCC-546 Principles of Biostatistics I

Covers statistical issues in clinical trial design. This includes blinding, randomization, bias, and intent to treat. Use of descriptive statistics and graphical techniques to explore patterns in data. A review of the basic properties of probability and the characteristics of the normal and binomial distributions. One and two sample inference and hypothesis testing for proportions, means and medians, one way analysis of variance and simple linear regression including diagnostics based on residuals and confidence intervals for regression coefficients are covered. Hypotheses testing for cross-classified data are also discussed.

3.00, Classroom | Web Component

GCC-546 Principles of Biostatistics I

Covers statistical issues in clinical trial design. This includes blinding, randomization, bias, and intent to treat. Use of descriptive statistics and graphical techniques to explore patterns in data. A review of the basic properties of probability and the characteristics of the normal and binomial distributions. One and

two sample inference and hypothesis testing for proportions, means and medians, one way analysis of variance and simple linear regression including diagnostics based on residuals and confidence intervals for regression coefficients are covered. Hypotheses testing for cross-classified data are also discussed.
2.00, Classroom | Web Component

GCC-547 Principles of Biostatistics II

Covers multifactor analysis of variance, multiple regression, logistic regression including Hosmer-Lemeshow goodness-of-fit and receiver-operating curves. Survival analysis including log rank tests, Kaplan-Meier curves and Cox regression are covered. Additionally, statistical software packages such as SAS or SPSS are discussed.
3.00, Classroom | Web Component

GCC-547 Principles of Biostatistics II

Covers multifactor analysis of variance, multiple regression, logistic regression including Hosmer-Lemeshow goodness-of-fit and receiver-operating curves. Survival analysis including log rank tests, Kaplan-Meier curves and Cox regression are covered. Additionally, statistical software packages such as SAS or SPSS are discussed.
2.00, Classroom | Web Component

GCC-548 Bioinformatics

This course provides a practical, broad-based foundation in biomedical informatics. Topics in acquisition, analysis, and storage of information in health care, biomedical research, and public health will be presented. The course will primarily use a problem-oriented interactive format to illustrate meaningful applications of information technology. Publicly available large data sets and tools will be used to teach basic techniques in data collection and queries, visual presentation of data, comparative effectiveness analysis, decision support, natural language processing, and genomics. No computer programming skills are required.
1.00, Classroom

GCC-551 Ethics and IRB

This course provides the framework around which clinical research projects are based in terms of the Institutional Review Board. The course includes didactic lectures on the legal requirements of informed consent, regulatory processes, intellectual property, the role of the office research integrity as well as required participation on IRB review panels inside the University.
2.00, Classroom | Web Component

GCC-552 Introduction to Regulatory Process

Lectures cover drug discovery, the U.S. regulatory process including IND and NDA and clinical trials I through IV. The course also includes lectures on drug metabolism, principles of toxicity, adverse drug reaction reporting, the IRB responsibilities of investigators, biologic and generic drug development, PK/PD modeling, orphan drug development, and medical device approval.
3.00, Classroom

GCC-552 Introduction to Regulatory Process

Lectures cover the process of Drug and Device Discovery, the IND or IDE process, preclinical research, clinical research process for Drug and Device studies, New Drug application, international drug development guidelines, IRB in drug research, device development, reporting adverse drug reactions, the use of biologic markers in trials, drug metabolism, Genetics in Drug Development and orphan drug development, as well as PK/PD modeling in Drug Development.
2.00, Classroom | Web Component

GCC-593 Introduction to Grantsmanship

The course builds on Tools for Research. The aim of this course is to teach the trainee how to organize and highlight the most important parts of a grant proposal. The course emphasizes writing style, consistency and integration of thought. All aspects of an NIH proposal are emphasized including the genesis of the budget and budget justification. P/N grading for clinical research students. Letter grade available for other majors.
1.00, Classroom | Web Component

GCC-620 Introduction to Teaching

This course builds crucial educational skills that Ph.D. graduates will need to function as teachers in academia. Designed as a mentored experience for Ph.D. candidates, the course will offer theoretical and practical experience in graduate teaching. Individually designed series of practicum units will be arranged for each student, which will best support student interests and learning needs to build a teaching portfolio. Over the span of 3-4 quarters, students will enroll in 1-3 credit hours based on prior teaching experiences and recommendations from the Course Director and from their advisors.
1.00-3.00, Classroom | Web Component

GCC-620 Introduction to Teaching

This course builds crucial educational skills that Ph.D. graduates will need to function as teachers in academia. Designed as a mentored experience for Ph.D. candidates, the course will offer theoretical and practical experience in graduate teaching.

Individually designed series of practicum units will be arranged for each student, which will best support student interests and learning needs to build a teaching portfolio. Over the span of multiple terms, students will enroll in 1-2 credit hours based on prior teaching experiences and recommendations from the Course Director and from their advisor.

1.00-2.00, Classroom | Web Component

GCC-699 Dissertation Research

This course provides credit for the research that forms the basis for scientific presentation, publications and ultimately the Doctoral Dissertation. The student performs the research in the Mentor/Advisor's laboratory and is involved with proposing, planning, and the execution of the Dissertation Research. The Mentor and the Dissertation Committee assess the research and evaluate student progress in research, research collaboration and the scientific communication of research. The course spans several terms until the Dissertation Committee approves the Dissertation. Registration requires completion of the first year courses and approval of a Mentor by the Program Director of the Integrated Biomedical Sciences program.

1.00-9.00, Laboratory | Web Component

GCC-711 Advanced Readings in Molecular Biology

Readings course that covers literature central to the topics of GCC-501 and the application to the disease processes.

1.00, Classroom | Web Component

GCC-712 Advanced Readings in Cellular Biochemistry

Readings course that covers literature central to the topics of GCC-502 and the application to the disease processes.

1.00, Classroom | Web Component

HHV-501 Introduction to Health Care Ethics

This interdisciplinary course considers basic theories of ethics and principles of health care ethics, gives students experience applying two methods of ethical analysis of cases, and examines issues such as paternalism vs. enhancement of patients' autonomy, justice, beneficence, and nonmaleficence. (web-based only)

3.00, Online Only

HHV-502 Major Issues-Health Care Ethics

Focus of the course is on "End of Life" - Ending Life" with topics such as advance directives, DNR's, withholding and withdrawing treatment, treatment decisions and ethics, PVS, brain death, euthanasia, allocation, etc. Both ethical and legal perspectives are considered. Prerequisite HHV 501. (web-based only)

3.00, Online Only

HHV-503 Seminar in Health Care Ethics

Students present a major seminar paper on an approved topic in clinical health care ethics, and lead discussion around the issue.

Prerequisite HHV 502. (web-based only)

3.00, Online Only

HHV-504 Ethics/Healthcare Interdisciplinary Perspectives

This interdisciplinary course will introduce students to foundational theories of health care ethics, ethical decision-making frameworks, legal and professional standards in health care ethics, institutional and interprofessional ethical constraints, and major ethical issues facing health care professionals. Students will have the opportunity for case analysis and discussion with students from other professions with which they will some day be practicing. Course content will include lecture, on-line content, case analysis, and discussion.

2.00, Classroom | Web Component

HHV-504M Ethics/Healthcare Interdisciplinary Perspectives

This interdisciplinary course will introduce students to foundational theories of health care ethics, ethical decision-making frameworks, legal and professional standards in health care ethics, institutional and interprofessional ethical constraints, and major ethical issues facing health care professionals. Students will have the opportunity for case analysis and discussion with students from other professions with which they will some day be practicing. Course content will include lecture, on-line content, case analysis, and discussion.

2.00, Classroom | Web Component

HHV-510 Seminar in Health Human Values

Interdisciplinary seminar integrating the written, visual and performing arts with philosophical and clinical issues and approaches to health care. Includes Campbell Lectures each quarter taken.

1.00-3.00, Classroom | Web Component

HHV-512 The Clinic and Ethics Classics

This course closely reads Aristotle, Kant, and Mill, asking two questions: What do the classical authors in ethics have to say to contemporary clinicians? What do contemporary clinicians have to say to those authors? One hour of this course may be offered online.

1.00-4.00, Classroom | Web Component

HHV-520 Ethics - Healthcare Professional

This four-week intensive course will examine a variety of ethical issues in health care encountered throughout the lifespan. A methodology for case analysis will be used drawing on examples from the participants' own clinical experiences. An ethics of care perspective will augment the traditional analytic approach by examining the characteristics of relationships in the health care context including the roles of power, empathy, suffering and other moral experiences and emotions.

2.00, Classroom | Web Component

HHV-525 Narrative and Medicine

A characteristic of the human species is that we think in metaphors and learn through stories. In the midst of crises, persons construct stories that give meaning to events. This course is designed to focus on understanding how persons create meaning out of the experiences of disease and suffering. Through improvisational exercises, students discover how to be in tune with stories and their tellers.

1.00-3.00, Classroom | Web Component

HHV-532 Introductory Holistic Spiritual Assessment

In the context of a review of holistic approaches to patient assessment, this course provides an introduction to spiritual assessment. Several significant models for spiritual assessment are presented and evaluated. The models are applied with case studies and/or patient interviews.

3.00, Classroom | Web Component

HHV-533 Theology of Pastoral Care

A seminar in which students study various theological approaches to pastoral care and formulate their own theology of the discipline.

2.00, Classroom | Web Component

HHV-534 Suffering

Health care practitioners inevitably engage the issue of human suffering. Course examines the nature of suffering, the suffering of the healthier, approaches to living with suffering.

1.00, Classroom | Web Component

HHV-535 Spirit/Mind/Body

Course examines research of faith and health outcomes, psychoneuro-immunology, mind/body concepts, complementary therapies, and an introduction to the practice of proven techniques for enhancing health through spirit/mind/body integration.

3.00, Classroom | Web Component

HHV-541 Seminar Theological Reflection I

Using a 'story theology' model, students bring narratives from their own experience as well as from the experience of patients/clients to discern major theological themes.

1.00, Classroom | Web Component

HHV-542 Seminar Theological Reflection II

Using a 'story theology' model, students bring narratives from their own experience as well as from the experience of patients/clients to discern major theological themes.

1.00, Classroom | Web Component

HHV-543 Seminar Theological Reflection III

Using a 'story theology' model, students bring narratives from their own experience as well as from the experience of patients/clients to discern major theological themes.

1.00, Classroom | Web Component

HHV-551P Clinical Practicum I

Supervised clinical experience in ethics in a setting appropriate to learning goals. Settings include Medical Intensive Care Unit, Neurosurgical Intensive Care Unit and the Brain Injury Group, and Special Care Nursery. Each practicum addresses a basic theme of biomedical ethics: Autonomy (Practicum I).

2.00, Practicum

HHV-552P Clinical Practicum II

Supervised clinical experience in ethics in a setting appropriate to learning goals. Settings include Medical Intensive Care Unit, Neurosurgical Intensive Care Unit and the Brain Injury Group, and Special Care Nursery. Each practicum addresses a basic theme of biomedical ethics: Beneficence and Nonmaleficence (Practicum II).

2.00, Practicum

HHV-553P Clinical Practicum III

Supervised clinical experience in ethics in a setting appropriate to learning goals. Settings include Medical Intensive Care Unit, Neurosurgical Intensive Care Unit and the Brain Injury Group, and Special Care Nursery. Each practicum addresses a basic theme of biomedical ethics: Justice (Practicum III).

2.00, Practicum

HHV-554P Clinical Practice IV: Ethics Consultation

Students are paired with a working ethics consultant for rounds and general ethics coverage. Students begin writing ethics consultations, review cases, and examine readings pertaining to ethics consultation.

2.00, Practicum

HHV-586 Reading/Research Religion/Health

Individual projects under the supervision of faculty member.
1.00-3.00, Classroom | Web Component

HHV-711 Medical Ethics

Collaborating with at least one seasoned ethicist, M4 students study questions and topics that have captured their attention during previous clinical study. In this process, they can explore their own moral reasoning and enhance their ability to conduct moral analysis of clinical medicine. Students may attend clinical events that pertain to their question, read contemporary or classical ethics literature, review medical research for ethics embedded in evidence-based practice, consult with members of the faculty of medicine, or be involved in other activities that advance their inquiry.
2.00, Clinical

HHV-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.
1.00-4.00, Independent Study

HHV-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
Continuous Enrollment

HSC-301 Introduction to the Health Professions

This course will introduce the student to the broad array of health occupations and professions that are essential to the provision of health care. Nursing, medicine and allied health will be reviewed, and the role, function, education, licensure and scope of practice of the various health professions will be discussed. Core interprofessional health care competencies will be reviewed.
4.00, Classroom | Web Component

HSC-302 Anatomy w/Laboratory

This human anatomy course will provide students with a thorough understanding of functional and applied human anatomy. Lectures, anatomic models and cadaver dissection will be utilized in teaching this course. The structure and function of the human body are examined topographically through laboratory dissection, lectures and preceptorials.
5.00, Classroom | Laboratory | Web Component

HSC-303 Professional Writing

This course is designed to develop scientific and technical writing by providing students with the foundations of grammatical scrutiny necessary to provide quality communication practices and the tools to become proficient at writing professional goals and objectives, as well as clinical and scientific reports. It will also familiarize students with the investigative processes involved in syntax analyses and proofreading clinical and scientific reports. It emphasizes a systematic approach that enables students to produce a variety of scientific and technical communications in a well-presented, clear and concise style.
3.00, Classroom | Web Component

HSC-304 Laboratory Fundamentals

Comprehensive instruction in laboratory mathematics, laboratory techniques, quality control, regulatory issues and safety. Medical terminology is included as an online component.
4.00, Classroom | Web Component

HSC-305 Principles of Biochemistry

This course will analyze the structure, properties, functions and metabolism of carbohydrates, lipids and proteins. The laboratory teaches basic biochemical techniques such as centrifugation, electrophoresis, biomolecular modeling and bioinformatics. Students will also learn to extract, isolate and characterize a single protein. This course is designed for students in the medical technology, food science, chemistry and pre-professional health majors. Writing assignments, as appropriate to the discipline, are part of the course.
4.00, Classroom | Web Component

HSC-311 Medical Physiology

This course is designed to provide students with a comprehensive understanding of human physiologic function, regulation, and integration as a basis for understanding the complex interaction of specific body systems and their relationship to disease.
5.00, Classroom | Web Component

HSC-312 Clinical Immunology

An introduction to the basic concepts and terminology of immunity including development, structure and function of the

lymphoid systems; the basis of antigenicity; antibody structure; methods of detection and measurement; mechanism of cellular immunity; white cell function; hypersensitivity reactions; the complement system; and mechanisms of immune suppression and tolerance. Topics include the immune response and the laboratory testing related to measuring the immune response; the pathogenesis and laboratory diagnosis of immunological disorders such as hypersensitivities, immune deficiencies, and autoimmunity.

4.00, Classroom | Web Component

HSC-313 Health Care Ethics

This course focuses on the basic foundational theories of ethics and practical application of principles of medical and research ethics. Health Care Ethics explores moral values and judgments as they apply to medicine and ethical principles associate with research. It also elaborates on the ethical decision making framework, and ethical principles that govern the practice of medicine.

3.00, Classroom | Web Component

HSC-314 Health Care in America

Health Care in America is designed to inform students of the present structure and design of the healthcare system. This course discusses the organization and delivery of health services, the economics and financing of health care, the nation's health care workforce, access to and quality of health services. The course explores topics that address current issues in America's health care system. The student will understand what is prompting reform and the significant changes in healthcare reform legislation.

3.00, Classroom | Web Component

HSC-321 Hematology

This course is designed to introduce basic hematologic concepts and introduce concepts in coagulation and hemostasis as well as urinalysis and analysis of the various body fluids. Topics include: Venipuncture, complete blood counts (CBCs), hemopoietic theory, erythrocyte metabolism, hemoglobin synthesis, erythrocyte dyscrasias, FAB classifications of leukemias and leukocyte dyscrasias of various etiologies. Included is the analysis of various body fluids with emphasis on the theory and practice of clinical procedures. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates and exudates.

4.00, Classroom | Web Component

HSC-322 Clinical Chemistry

Biochemistry, analysis and application of clinically significant chemical substances. Covers non-protein nitrogens, lipids,

cardiac markers, liver enzymes, renal function hemoglobin degradation products, electrolytes, pH and blood gasses, pharmacokinetics, therapeutic drug monitoring, vitamins, endocrinology, toxicology, and fetal/maternal testing. Included is the correlation of data for selected disease states.

4.00, Classroom | Web Component

HSC-323 Health Care Disparities

Students will examine aspects of the health care system related to health risk, access, outcomes and cost and associated health care disparities. Causes of poor health access and adverse health outcomes will be discussed, as well as issues related to cultural competency. This course explores the complexities and dimensions of health and illness through diverse cultural perspectives. Social and historical factors that may be involved will be reviewed, as well as possible solutions to ensure access to cost-effective, quality health care.

4.00, Classroom | Web Component

HSC-324 Biostatistics

This course will focus on concepts and procedures for descriptive and inferential statistics for continuous and discrete data and data analysis using parametric and nonparametric statistical procedures. Computerized statistical programs, such as SPSS, will be used.

3.00, Classroom | Web Component

HSC-331 Microbiology

This course will provide a review of the general biology of infectious agents and the basic concepts and principles of immunology, including medically important microorganisms and their relationship to disease. Identification of selected groups of pathogens, epidemiology, mechanisms causing disease and the biological basis for resistance will be covered. Identification, classification, cellular structure, pathogenic mechanisms, genetics, epidemiology, serology, and prevention and treatment of disease will be described. Specimen collection and the isolation and identification of medically important bacteria will be described and mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Colony morphology of clinically important bacteria and procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays, will be discussed. These activities are then applied to the identification of unknown bacterial isolates found in patient specimens.

5.00, Classroom | Web Component

HSC-332 Introduction to Research

This course introduces students to methods of scientific research to include review of literature, research designs, sampling techniques, measurement, and related issues. Research articles

that exemplify various research designs, presentation of results, and conclusions will be reviewed and discussed to enable to the student to grade the quality and level of evidence associate with published research.

5.00, Classroom | Web Component

HSC-333 Epidemiology

This course introduces students to the principles and practices of epidemiology and provides them with a population-based perspective on health and disease. Students learn basic measurements of frequency and association, and methods employed in describing, monitoring and studying health and disease in populations. Students will gain a working knowledge of key concepts in epidemiology and biostatistics, and an understanding of key aspects associated with introducing strategic initiatives.

4.00, Classroom | Web Component

HSC-401 Mycology, Parasitology & Virology

This course provides clinical background in mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. Identification, specimen collection and processing of medically important viruses, fungi and parasites will be discussed.

4.00, Classroom | Web Component

HSC-402 Genetics

The principles of genetics and genetic testing will be discussed related to health and disease.

4.00, Classroom | Web Component

HSC-403 Health Care Informatics

This course will introduce students to health informatics. It examines trends and emerging technologies involved in health care delivery and information systems/technology management within diverse health care settings. Content includes the provider order entry (CPOE), the electronic medical record, pharmacy systems, billing systems, business intelligence/data warehousing systems and bio-surveillance methods. In addition, students will discuss ethical and legal considerations and aspects related to the use of computerized technology and information systems in the delivery of health care.

4.00, Classroom | Web Component

HSC-404 Nutrition

Principles of human nutrition and metabolism as well as nutritional planning for the maintenance of health and wellness across the life span (infant, childhood, adolescent, adulthood, and later) are explored. The course will elaborate on the role of nutrients in the body and how they affect function in the normal human as well as those with a chronic disease process. The methods and

equipment used to provide nutritional analysis will be discussed and demonstrated.

3.00, Classroom | Web Component

HSC-411 Molecular Diagnostics

The molecular biology course consists of an introduction to principles, methodologies and applications of molecular biological procedures used in the clinical laboratories. Emphasis is placed on the molecular biological procedures used in the identification of infectious agents that cause human disease and in the detection of mutations resulting in neoplasm or congenital disorders.

Prerequisite: Departmental permission

4.00, Classroom | Web Component

HSC-412 Patient Assessment

General and system specific concepts related to the causation and clinical presentations of pathology across the life span are discussed. Prototype diseases are used to illustrate pathologic concepts. Use of medical interviews, physical examinations, and interpretation of examination findings will be introduced. Instruction on the components of the health history (chief complaint, present illness, past history, family history, personal and social history, review of symptoms) is provided. Physical examination including the general survey of the patient, vital signs, skin, head and neck exam, thorax and lungs, cardiovascular and peripheral vascular systems, breasts and axillae, abdomen, genitalia and rectal exams, musculoskeletal system, and the mental status and nervous system exams will be introduced.

Prerequisite: Departmental permission.

4.00, Classroom | Web Component

HSC-413 Pharmacology

Provides a conceptual approach to understanding pharmacokinetics, pharmacodynamics and pharmacotherapeutics. Stresses scientific principles underlying pharmacological treatments. The autonomic nervous system and related drug actions, anti-inflammatory drugs, autacoids, neuropharmacology, psychopharmacology, and anesthetic/analgesic pharmacology will be reviewed. Cardiovascular, diuretic and respiratory agents, hypoglycemic agents, drugs acting on the blood and blood-forming organs, toxicology, antibiotics and cancer chemotherapeutic agents will be discussed. Pharmacotherapeutics for common acute and chronic health conditions are described. Medications used for the diagnosis and treatment of a variety of physical and psychiatric disorders and will be reviewed. Prerequisite: HSC 304 or 305 and Departmental permission.

4.00, Classroom

HSC-421 Practicum

The practicum builds upon the theoretical knowledge and techniques introduced during didactic courses in the first year. Students will complete experiences of their choices (as available) in health profession for which they plan to enter graduate school to complete. Offerings may include nursing, medicine, and various allied health fields. Students will shadow the health care provider as they conduct their day to day work. Student rotations will generally be two days per week, Prerequisite: Departmental permission.

5.00, Classroom

HSC-422 Capstone Project

A meaningful project related to the health science will be designed, implemented and completed by the student the direction of a faculty member, Prerequisite Departmental permission.

5.00, Classroom

HSC-450 Management Principles

The students will learn principles of management to include planning, organizing, directing and controlling, management and evaluation of personnel and programs, motivational theory, decision making, conflict management, principles of delegation, and financial management.

4.00, Classroom | Web Component

HSC-601 Education Theories and Methods

This course will review models of learning theory as they relate to higher education, professional education and adult and career continuing education contexts, as well as application of learning theory to teaching methods and evaluation. Various learning theories will be introduced, to include behavioral, cognitive and constructive theory, motivation and newer theories of learning based on cognitive science.

3.00, Online Only

HSC-602 Curriculum and Instruction

This course provides hands-on experience with developing competency-based curricula for health science education programs. Program development, needs assessment, goals, course construction and sequencing, course descriptions, objectives, outlines, syllabi, content and outcomes assessment and evaluation for specific learning audiences will be described.

3.00, Online Only

HSC-603 Methods and Evaluation

A comprehensive review of various teaching methods and learning outcome evaluation techniques. Topics included are developing and implementing course goals, objectives, learning activities,

lesson plans, synchronous and asynchronous learning platforms, evaluation methods, test construction and course and program evaluation. Psychometric measures and interpretation, including item analysis and descriptive statistics are included.

3.00, Online Only

HSC-604 Teaching Practicum

Graduate students will engage in one or more of a variety of interrelated teaching activities — lecturing, class discussion, one-to-one tutoring, office hours, and grading in the various specialty and core curriculum under the direct supervision of a faculty member. Students will also be required to complete didactic assignments related to curriculum design, presentation and evaluation.

3.00, Online Only

HSC-609 Professional Writing Skills

This course is designed to develop scientific and technical writing skills. A systematic approach presenting a variety of scientific and technical communication skills will be used. A review of the effective use of library scientific resources will be presented to facilitate the comprehension of the flow of scientific information. This course will focus on the requirements for abstract, manuscript and grant application writing. Topics include abstract writing, manuscript writing and grant writing.

4.00, Online Only

HSC-610 Research Design I

This course introduces students to methods of scientific research to include review of literature, research designs, sampling techniques, measurement, and related issues. Research articles and research thesis that exemplify various research designs, presentation of results, and conclusions will be reviewed and discussed. Students will further develop their information literacy skills to search, interpret and evaluate the medical literature in order to maintain critical, current and operational knowledge of new medical findings including its application to individualized patient care.

4.00, Online Only

HSC-611 Research Design II

This course introduces the student to methods of research using qualitative design and appropriate statistical analysis techniques used in qualitative data analysis. Questionnaire and survey construction, validation and statistical analysis techniques will be discussed. Advantages and disadvantages of interview data collection techniques as well as techniques such as Delphi are included.

4.00, Online Only

HSC-612 Statistics I

This course will focus on concepts and procedures for descriptive and inferential statistics for continuous and discrete data and data analysis using parametric and nonparametric statistical procedures. Computerized statistical programs, such as SPSS, will be used. Instruction on information literacy to equip students with the necessary skills to search, interpret and evaluate the medical literature in order to maintain critical, current and operational knowledge of new medical findings including its application to individualized patient care will be included.

4.00, Online Only

HSC-613 Statistics II

This course will be a continuation of HSC-612. Hypothesis testing techniques, which involve observation and analysis or more than one statistical variable at a time, will be discussed. Examples include ANOVA, ANCOVA, MANOVA, MANCOVA, T-tests and regression models.

4.00, Online Only

HSC-615 Research Seminar I

First part in planning and conducting the required dissertation research project. Students are expected to begin to formulate their research question(s) to include background and significance, problem and purpose statement, need for the study, assumptions, limitations and delimitations and definitions. Students will also complete their review of the literature in preparation for their preliminary research proposal defense.

1.00, Online Only

HSC-616 Research Seminar II

Continuation of Research Seminar I. Students will continue planning and conducting the required dissertation research project. Students are expected to begin to formulate their research methods and procedures and complete preparation for their research proposal defense.

1.00, Online Only

HSC-617 Dissertation Research

Students complete research in preparation of a dissertation in partial fulfillment of the requirements of the degree program. Includes supervision while student is writing the doctoral dissertation following all required course work. LT grade Repeated until dissertation has been successfully defended.

1.00-12.00, Classroom

HSC-620 Leadership Theory

Provides an overview of evidence-based methods for evaluating and developing leaders and leadership. Topics include: the history of leadership assessment and leadership theory; use

of validated assessment methods in measuring leadership(eg, interviews, assessment centers and cognitive and objective assessments); applications of adult development and career development theory; and organizational approaches to leadership development (eg, talent reviews, developmental assignments, 360-degree feedback and succession/acceleration programs).

3.00, Online Only

HSC-621 Issues & Trends in Health Care

Current issues and trends in health care are discussed. An overview of the United States health care system, its history, structure, major components and overall performance is provided, followed by a review of the interrelationships among various trends and forces that are likely to shape the roles and responsibilities of health care institutions in the future. Students become well versed in the major issues facing the health care industry and the public/private/individual roles needed to address these issues. Concepts in organizational behavior, health economics, health care finance, health care planning and marketing, and health insurance and managed care are discussed.

3.00, Online Only

HSC-622 Ethics in Clinical & Research Setting

This web based course provides the student with an interactive format to discuss the researcher's responsibilities for conducting ethically sound scientific research as well as select ethical issues in research. Each student will have the opportunity to analyze an ethical issue as it relates to the student's research project or topic.

4.00, Online Only

HSC-623 Management & Supervision Higher Education

Principles of management and supervision as they relate to the organization and administration of higher education and the academic department will be discussed. Governance of higher education to include organization, control, funding, and evaluation will be described and the principles of management and supervision as they relate to the administration of the academic department will be discussed. Basic principles of management to include planning, organizing, directing and controlling, management and evaluation of personnel and programs, motivational theory, conflict management and principles of delegation will be covered.

3.00, Online Only

HSC-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet

with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study | Web Component

HSC-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

HSM-502 Health Care Organization

This course provides an overview of the United States health care delivery system. Students will understand and analyze the historical evolution, structure, financing mechanisms, major provider components, overall performance, and future directions of the system. Students have the opportunity to interview health care consumers to understand their interface with the system and related medical, social, and economic issues. Through class discussions, debates and guest lecturers, students gain an understanding of the major issues facing the system and consider alternative approaches to improve the system. The course provides students with a framework to organize knowledge of the health care system to support further study in health services administration.

2.00, Classroom | Web Component

HSM-504A Professional Seminar I

The purpose of this course is to develop professionalism skills and data management skills. In this course, professionalism in terms of time management, planning and running effective meetings, working in and managing project teams, and written and verbal communication, including email and executive memo etiquette is re-enforced with helpful tips and in-class exercises. Building upon basic and intermediate excel and access knowledge, data management skills are further strengthened to handle real world data challenges (i.e., domain and data understanding, data cleaning, data transformation, output generation, and creating reports and dashboards) to facilitate decision making. This course should adequately prepare students for future projects/responsibilities, both in the classroom and the work environment.

2.00, Classroom | Web Component

HSM-504A Professional Seminar I

The purpose of this course is to review basic professional principles. In this course, professionalism in terms of time management and written and verbal communication including email and executive memo etiquette is reenforced with helpful tips and in-class exercises. Topics related to interprofessionalism will be introduced. This course should adequately prepare students for future internship and job responsibilities.

2.00, Classroom | Web Component

HSM-504B Professional Seminar II

This course builds upon skills introduced in Professional Seminar I and is designed to prepare students for employment interviews and for careers in health management. Exercises include recorded telephone, video and dining simulations and students are evaluated and coached by faculty. The emphasis of the course is placed on oral and written communication skills relevant to consulting, hospital, physician group, and association management. Students will gain confidence and competence in networking and job search strategies.

2.00, Classroom | Web Component

HSM-505 Introductory Clinical Concepts/Patient Care

The course provides an introduction to clinical terminology and how patient care happens in the healthcare setting. Concepts that are related to disease, health, healing, health professions, professionalism, and the experience of the patient are reviewed and discussed. The role of health professionals and the interdisciplinary nature of their work are introduced with emphasis on communication (interpersonal, written, presentation), problem solving, and patient care improvements across professional boundaries. How patient care is delivered in both the outpatient and inpatient settings is reviewed.

2.00, Classroom | Web Component

HSM-505 Patient Experience

The course will provide participants the background and experience in developing an understanding of the patients' perceptive of their care and how this is increasingly used to improve quality, safety, efficiency, staff engagement, and financial performance as well as minimize litigation risks. The course will introduce patient experience measurement and monitoring tools as well as evidence based strategies to improve overall patient experiences. The course will be taught using relevant case studies, guest speakers, patient interviews, and real-world projects to understand and improve patient experiences.

2.00, Classroom | Web Component

HSM-506 Patient Experience

The course will provide participants the background and experience in developing an understanding of the patients' perspective of their care and how this is increasingly used to improve quality, safety, efficiency, staff engagement, and financial performance as well as minimize litigation risks. The course will introduce patient experience measurement and monitoring tools as well as evidence based strategies to improve overall patient experiences. The course will be taught using relevant case studies, guest speakers, patient interviews, and real-world projects to understand and improve patient experiences.

2.00, Classroom | Web Component

HSM-514 Statistics for Health Management

This course emphasizes intermediate statistical principles that healthcare managers use for achieving optimal organizational performance, pursuing organizational transformation, and conducting research. Topics include descriptive statistics, normality, probability and non-probability sampling, parametric and non-parametric hypothesis testing, and regression. Statistical software packages including SPSS, Excel, and R are reviewed and utilized. Prerequisite: undergraduate statistics.

4.00, Classroom | Web Component

HSM-514 Statistics for Health Care Management

This course emphasizes intermediate statistical principles that healthcare managers use for enhancing healthcare management, promoting population health, and conducting health services research. Topics include descriptive statistics, normality, parametric and non-parametric hypothesis testing, and regression models. Statistical software package (SPSS) is reviewed and utilized. Prerequisite: undergraduate statistics.

3.00, Classroom | Web Component

HSM-515 Human Resources Management

This course provides an understanding of the human relations skills required of the health systems manager in an environment filled with both federal and state legal constraints. Skills acquired include motivating and coaching employees, appraising and improving performance, dealing with disciplinary problems, and employee counseling.

4.00, Classroom | Web Component

HSM-523 Managerial Epidemiology

This course focuses on managerial epidemiologic principles that healthcare managers use to inform strategic initiatives and to achieve optimal organizational performance. Topics include market segmentation, needs analysis, research design, program planning and program evaluation. Prerequisite: HSM-514 or NUR-510 or concurrently.

3.00, Classroom | Web Component

HSM-531 Finance I: Accounting Principles

Designed to provide an understanding of the concepts/principles of accounting and finances and their application in health systems management.

4.00, Classroom | Web Component

HSM-531 Health Care Financial Accounting

This course provides students with a solid understanding of financial accounting concepts/principles as they relate to the health care industry. The course is taken during the fall quarter of the first year and prepares students to analyze and utilize accounting information to make management decisions. Many of the concepts learned will be applied during other courses in the HSM curriculum. Prerequisite: undergraduate accounting.

4.00, Classroom | Web Component

HSM-532 Finance II Health Care Management Accounting

This course moves beyond basic financial accounting to how financial information is used to manage and make decisions. From the revenue perspective, students are expected to learn and demonstrate an understanding of the way health care providers are paid for services based on the source of payment (Medicare, Medicaid, managed care) and the payment methodology. From a cost perspective, cost allocation methodologies as well as types of costs, e.g. fixed, variable, semi-variable, will be taught. Case studies, in-class exams, and team presentations will be used to evaluate students' competencies to assemble revenue and cost information to make strategic decisions and construct budgets and business strategies. The examples used will focus on existing and emerging reimbursement trends that are impacting health care organizations. Prerequisite: HSM-531.

3.00, Classroom | Web Component

HSM-532 Health Care Managerial Accounting

This course moves beyond basic financial accounting to how financial information is used to manage and make decisions. From the revenue perspective, students are expected to learn and demonstrate an understanding of the way health care providers are paid for services based on the source of payment (Medicare, Medicaid, managed care) and the payment methodology. From a cost perspective, cost allocation methodologies as well as types of costs, e.g. fixed, variable, semi-variable, will be taught. Case studies, in-class exams, and team presentations will be used to evaluate students' competencies to assemble revenue and cost information to make strategic decisions and construct budgets and business strategies. The examples used will focus on existing and emerging reimbursement trends that are impacting health care organizations.

3.00, Classroom | Web Component

HSM-532 Health Care Managerial Finance

This course moves beyond basic financial accounting and corporate finance and explores how financial information is used to manage and make decisions.

3.00, Classroom | Web Component

HSM-532 Health Care Managerial Finance

This course moves beyond basic financial accounting and corporate finance and explores how financial information is used to manage and make decisions. Students are expected to learn and demonstrate an understanding of the way health care providers are paid for services based on the source of payment (Medicare, Medicaid, managed care) and the payment methodology. Cost allocation methodologies as well as types of costs, e.g. fixed, variable, semi-variable, will be taught. Students will gain a basic understanding of concepts critical to developing a long-term financial plan and operational and capital budgets. The course will employ didactic as well as experiential learning techniques. Case studies, in-class exams, and team presentations will be used to evaluate students' competencies to assemble revenue and cost information to make strategic and operational decisions and construct budgets and business strategies. The examples used will focus on existing and emerging trends that are impacting health care organizations.

4.00, Classroom | Web Component

HSM-533 Health Care Economics

Students will learn the principles and tools of microeconomics and apply these principles and tools to the health care market. This course emphasizes applications of health economics that are directly relevant in today's political and economic climates, including the demand and supply of health care, physician productivity and incentives, health care labor markets, health insurance and medical malpractice. Applications will also explore specific sectors of the health care market, such as the hospital, physician and pharmaceutical industries. By the end of the quarter, students will be able to evaluate, both at a conceptual and at an analytical level, arguments about how the markets for health care and health insurance work. Prerequisite: HSM-514 or concurrent.

4.00, Classroom | Web Component

HSM-536 Corporate Finance

Enables students to understand the concepts and apply the tools of corporate finance and financial management. The overall objectives of the course are to understand the roles, functions and responsibilities of financial officers in managing a health care institution, be able to identify and analyze corporate finance problems and issues in the management of health care institutions, and be able to evaluate the financial performance of

institutions in asset and debt management. Cash flow, financial management of assets, timing and uncertainty and access to the capital markets are covered in order to understand the importance of finance to health care operations and strategic planning. Prerequisites: HSM-531, HSM-533 or concurrent.

4.00, Classroom | Web Component

HSM-543 Health Law

This course is designed as an introduction to law for emerging health care administrators. The topics survey a variety of legal issues that are relevant to the practice of healthcare administration, including regulatory law, fraud and abuse, employment, tort and business law among others. Key learning goals include developing an understanding of legal theory and the court system, demonstrating proficiency with analysis of central concepts of law applicable to health care administration, and fluency in applying legal standards to case studies.

3.00, Classroom | Web Component

HSM-545 Organizational Analysis and Change

This course is designed to help students develop a solid conceptual understanding of organizational processes from a socio-technical perspective, and gain experience in using this understanding in planning successful organizational change efforts. Content includes organizational culture, organizational ethics, motivation and performance, groups and teams, decision making and problem solving, diversity, communication, and leading and managing change. The course draws heavily on organizational and behavioral theory, but emphasizes application through team-based learning, experiential exercises and reflection on the exercises.

Prerequisites: HSM-502 and HSM-515.

4.00, Classroom | Web Component

HSM-549A Health Systems Management Part-time (PT) Internship

The standard HSM Internship requires real world work experience in a health care organization. HSM part-time students are almost always full-time working professionals in a health care organization. For PT students with fulltime work experience in a health care organization, the internship experience should require the part time student to perform duties or tasks in a highly distinguishable capacity than their current full time role at their employer organization. There are a number of options for part-time (PT) students, who work fulltime, to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with part-time students early in their studies to plan an approach that meets the characteristics of an "ideal" Rush Internship and emphasizes the 10 "distinguishing competencies" plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected.

1.00, Internship/Externship

HSM-549A Health Systems Management Part-time (PT) Internship

The standard HSM Internship requires real world work experience in a health care organization. HSM part-time students are almost always full-time working professionals in a health care organization. For PT students with fulltime work experience in a health care organization, the internship experience should require the part time student to perform duties or tasks in a highly distinguishable capacity than their current full time role at their employer organization. There are a number of options for part-time (PT) students, who work fulltime, to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with part-time students early in their studies to plan an approach that meets the characteristics of an "ideal" Rush Internship and emphasizes the 10 "distinguishing competencies" plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected. During first quarter, data management sessions will building upon basic and intermediate excel and access knowledge, data management skills are further strengthened to handle real world data challenges (i.e., domain and data understanding, data cleaning, data transformation, output generation, and creating reports and dashboards) to facilitate decision making.

1.00-3.00, Classroom | Web Component

HSM-549B Health Systems Management Part-time (PT) Internship

The standard HSM Internship requires real world work experience in a health care organization. HSM part-time students are almost always full-time working professionals in a health care organization. For PT students with fulltime work experience in a health care organization, the internship experience should require the part time student to perform duties or tasks in a highly distinguishable capacity than their current full time role at their employer organization. There are a number of options for part-time (PT) students, who work fulltime, to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with part-time students early in their studies to plan an approach that meets the characteristics of an "ideal" Rush Internship and emphasizes the 10 "distinguishing competencies" plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected.

1.00, Internship/Externship

HSM-549C Health Systems Management Part-time (PT) Internship

The standard HSM Internship requires real world work experience in a health care organization. HSM part-time students are

almost always full-time working professionals in a health care organization. For PT students with fulltime work experience in a health care organization, the internship experience should require the part time student to perform duties or tasks in a highly distinguishable capacity than their current full time role at their employer organization. There are a number of options for part-time (PT) students, who work fulltime, to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with part-time students early in their studies to plan an approach that meets the characteristics of an "ideal" Rush Internship and emphasizes the 10 "distinguishing competencies" plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected.

1.00, Internship/Externship

HSM-550A Health Systems Management Internship

The HSM internship requires a minimum of 440 hours of real world work experience in a health care organization. HSM fulltime students will almost always fulfill this requirement through part-time jobs within Rush University Medical Center or its affiliates during their first year in the program; however, fulltime students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. There are a number of options for part-time students, who work fulltime, to complete this degree requirement; the student's academic adviser and the program director work with part-time students early in their studies to plan an approach that meets the requirement and accommodates the student's fulltime job commitment. The internship emphasizes the 10 distinguishing competencies contained within the full set of 26 competencies for the National Center for Healthcare Leadership; these include: accountability, achievement orientation, leadership, collaboration, communication skills, professionalism, project management, and self-confidence. Demonstration of behavior consistent with the Rush ICARE values is also expected.

1.00, Internship/Externship

HSM-550A Health Systems Management Internship

The Health Systems Management internship requires a minimum of 440 hours of real world work experience in a health care organization. Health Systems Management fulltime students will almost always fulfill this requirement through part-time jobs within Rush University Medical Center or its affiliates during their first year in the program; however, fulltime students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. The

internship emphasizes the 10 distinguishing competencies contained within the full set of 26 competencies for the National Center for Healthcare Leadership; these include: accountability, achievement orientation, leadership, collaboration, communication skills, professionalism, project management, and self-confidence. Demonstration of behavior consistent with the Rush ICARE values is also expected. During the first quarter, data management sessions will build upon basic and intermediate Excel and Access knowledge, data management skills are further strengthened to handle real world data challenges (i.e. domain and data understanding, data cleaning, data transformation, output generation, and creating reports and dashboards) to facilitate decision making.

1.00, Internship/Externship

HSM-550B Health Systems Management Internship

The HSM internship requires a minimum of 440 hours of real world work experience in a health care organization. HSM fulltime students will almost always fulfill this requirement through part-time jobs within Rush University Medical Center or its affiliates during their first year in the program; however, fulltime students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. There are a number of options for part-time students, who work fulltime, to complete this degree requirement; the student's academic adviser and the program director work with part-time students early in their studies to plan an approach that meets the requirement and accommodates the student's fulltime job commitment. The internship emphasizes the 10 distinguishing competencies contained within the full set of 26 competencies for the National Center for Healthcare Leadership; these include: accountability, achievement orientation, leadership, collaboration, communication skills, professionalism, project management, and self-confidence. Demonstration of behavior consistent with the Rush ICARE values is also expected.

1.00, Internship/Externship | Web Component

HSM-550C Health Systems Management Internship

The HSM internship requires a minimum of 440 hours of real world work experience in a health care organization. HSM fulltime students will almost always fulfill this requirement through part-time jobs within Rush University Medical Center or its affiliates during their first year in the program; however, fulltime students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. There are a number of options for part-time students, who work fulltime, to complete this degree requirement; the student's academic adviser and the program director

work with part-time students early in their studies to plan an approach that meets the requirement and accommodates the student's fulltime job commitment. The internship emphasizes the 10 distinguishing competencies contained within the full set of 26 competencies for the National Center for Healthcare Leadership; these include: accountability, achievement orientation, leadership, collaboration, communication skills, professionalism, project management, and self-confidence. Demonstration of behavior consistent with the Rush ICARE values is also expected.

1.00, Internship/Externship | Web Component

HSM-551 Health Informatics

This class provides students with an introduction to Health Informatics, a field concerned with the use of information technology in healthcare. The course will provide students with an understanding of health information systems, including the electronic medical record, pharmacy systems, billing systems, and business intelligence/data warehousing systems. Students will understand how to use data from these informatics systems to measure the quality and costs of care. Additionally, students will gain expertise in national policy initiatives in health informatics. The course utilizes data assignments, hands-on technology experiences, and a team debate as teaching methods.

2.00, Classroom | Web Component

HSM-552 Health Care Information Systems

This course provides students with knowledge, skills and abilities related to how information technology is used to improve decision-making and problem-solving across the health care enterprise. Students will appreciate the role that information technology and systems play in finance, strategic planning, operations, quality, and human resources management. Students will be able to evaluate the acquisition, implementation, and ongoing management of information resources in health care. The course will also cover concepts of technology planning, the challenges of successfully introducing new technology and systems into the organization, the management and protection of the information asset, and the governance of the IT function.

2.00, Classroom | Web Component

HSM-557 Quality in Health Care

This course provides students with fundamentals of quality improvement in health care. Specifically, students will examine the history of quality improvement in hospitals and how that has translated into the current structures, processes and outcomes of the hospital improvement efforts of today. Emphasis

is placed on philosophy, framework, and methodology of quality improvement, with a specific focus on the measurement and analysis of data. Students will learn to use frameworks and tools to apply quality improvement strategies and sharpen their skills in turning data into information and in change management. Quality as it appears in current health policy will also be discussed

3.00, Classroom | Web Component

HSM-559 Health Care Planning and Marketing

This course develops students' understanding and appreciation of the health care planning and marketing processes. Through cases, business plan development, guest lecturers, and in-class discussions, topics are covered around all aspects of planning and marketing. These includes frameworks for strategic thinking and planning, consumer research, market segmentation, price, distribution and product strategies, advertising and promotion, mass communications/public relations, social media and evaluation of planning and marketing efforts. The development of persuasive marketing communication is studied from theoretical and practical perspectives. As a result of this course, students are able to discuss, assess and critically evaluate a healthcare organization's strategic planning and marketing initiatives.

Prerequisites: HSM-502, HSM-523.

4.00, Classroom | Web Component

HSM-560 Health Policy

This course provides an overview of the health care policy making process in the United States; more specifically, how key governmental institutions and political actors have influenced the development, dimensions, and financing of health care policy throughout American history and within the contemporary political environment. This course prepares students to analyze health policy through empirical examination of policy formation, implementation, and evaluation; with an emphasis placed on how policies affect cost, access, and quality; and analysis that can assist health care organizations to best respond to potential policy opportunities and threats. Prerequisites: HSM-502.

3.00, Classroom | Web Component

HSM-567 Health Insurance & Managed Care

This course provides an overview of the integration of health-care delivery and financing in the United States with an emphasis on public policy, contract negotiation, underwriting and pricing, and product and patient management. By the end of the quarter, students will be able to identify those elements important in insurance contracts, distinguish between public and private insurance plans, understand the underwriting behind an

insurance plan and how the product gets priced, identify health reform initiatives and its impact on patients, providers, and insurers, and formulate cost reduction strategies. Prerequisites: HSM-502, HSM-523, HSM-531.

3.00, Classroom | Web Component

HSM-572 Health Care Operations Management

This course provides students with the knowledge, skills and abilities needed to apply systems thinking, quantitative methods and other tools to better inform decisions and improve problem-solving in health care organizations. Students will appreciate the utility of these approaches for analyzing systems and improving processes. Emphasis is placed on students' abilities to work with managers and clinicians to analyze problems, identify possible solutions, implement process improvements, and communicate with stakeholders in non-technical terms. The course uses a combination of learning methods, including group discussion, multi-media, site visits and operational projects. Site visits and challenging assignments in real health care settings-such as emergency department throughput, operating room logistics, and support services roles-give students the opportunity to apply what they are learning. Pre-requisites: HSM-514 and HSM-551 or concurrent

4.00, Classroom | Web Component

HSM-576 Ethics for Health Care Managers

This course is designed to help students better understand the ethical dimensions of health administration decision-making, and use this understanding to effectively analyze decisions to support ethically sound judgments. Students will be able to identify the ethical content under fundamental conflicts and decisions faced by health care managers and analyze ethical problems of/in business, including identifying stakeholders, defining ethical conflicts, proposing multiple courses of action as well as the possible costs and benefits of each. This course also includes coverage of the most current and salient health care ethics issues. Prerequisite: HSM-502

2.00, Classroom | Web Component

HSM-590 Topics in Health Systems Management

These elective courses provide students with the opportunity to develop knowledge, skills, and abilities for specialized areas of health care management or in specific sectors of the health care industry. Past electives have focused on topics such as international health, facilities planning, technology assessment, health care and the elderly, physician practice management, and health care consulting. [2 elective credits per topic]

2.00, Classroom | Web Component

HSM-591 Care Coordination and Population Health

This course aims to introduce students to various aspects of population health—more specifically patient-centered care, care coordination, new models of care, community partnerships, community health needs-assessment and payment reform. Students will develop a strong background knowledge and understanding of the ever-changing healthcare landscape and why new models of care are being developed with a particular focus on population health, care coordination and the overall well-being of a patient. Students will hear from various population health experts from Rush as well as the Chicago community. Students will be able to apply what they're learning in the classroom to making recommendations to Rush's Population Health department, as it is currently developing.

2.00, Classroom

HSM-592 Topics in Health Systems Management II

These elective courses provide students with the opportunity to develop knowledge, skills, and abilities for specialized areas of health care management or in specific sectors of the health care industry. Past electives have focused on topics such as international health, facilities planning, technology assessment, health care and the elderly, physician practice management, and health care consulting. [2 elective credits per topic]

2.00, Classroom

HSM-593 Governance, Interprofessionalism/Leadership in Health Care

This course is designed to increase students' knowledge and competencies in the inter-related areas of leadership, inter-professionalism, and governance. For leadership, students will enhance their self-awareness concerning strengths and development needs as they relate to their career aspirations, through activities such as multi-source feedback and reflective learning exercises. Students will learn competencies associated with developing and maintaining effective interprofessional relationships, through interactive discussions with healthcare professionals as well as role-play exercises. Students will also develop their understanding and appreciation of the role of boards in organizational governance generally, with a focus on applications specific to the healthcare industry. Prerequisites: HSM-502, HSM-515, HSM-545.

4.00, Classroom | Web Component

HSM-593 Governance, Interprofessionalism/Leadership in Health Care

This course is designed to increase students' knowledge and competencies leadership and governance, with a special emphasis on the changing health ecosystem. For leadership, students

will enhance their self-awareness concerning strengths and development needs as they relate to their career aspirations, through activities such as multi-source feedback and reflective learning exercises. Students will also develop their understanding and appreciation of the role of boards in organizational governance generally, with a focus on applications specific to the healthcare industry.

3.00, Classroom | Web Component

HSM-593 Governance, Interprofessionalism/Leadership in Health Care

This course is designed to increase students' knowledge and competencies leadership and governance, with a special emphasis on the changing health ecosystem. For leadership, students will enhance their self-awareness concerning strengths and development needs as they relate to their career aspirations, through activities such as multi-source feedback and reflective learning exercises. Students will also develop their understanding and appreciation of the role of boards in organizational governance generally, with a focus on applications specific to the healthcare industry.

2.00, Classroom | Web Component

HSM-594 Topics in Health Systems Management III

These elective courses provide students with the opportunity to develop knowledge, skills, and abilities for specialized areas of health care management or in specific sectors of the health care industry. Past electives have focused on topics such as international health, facilities planning, technology assessment, health care and the elderly, physician practice management, and health care consulting. [2 elective credits per topic]

2.00, Classroom

HSM-596 Strategic Management-Health Care Organizations

Provides students with opportunities to apply the fundamentals of strategic planning and marketing, economics, finance, information system, and operations acquired in previous courses in the HSM curriculum to practical problems and decisions faced by real health care organizations. Students apply techniques of situational assessment, data analysis, strategy development and problem solving. As the capstone course for the HSM program, students are encouraged to integrate and refine their knowledge from all sources of learning in the HSM program to apply to business case studies. They conduct strategic analyses and develop and present strategic recommendations consistent with the mission, vision and values of an organization under the guidance of a teaching team of senior health care managers. The result is an improved ability to think critically, identify

strategic challenges, complete strategic analyses for different business problems, and communicate clearly.

4.00, Classroom | Web Component

HSM-596 HSM Capstone: Strategic Management Health Care Organizations

This course provides students with opportunities to apply the fundamentals of strategic planning and marketing, economics, finance, information systems, and operations acquired in previous courses in the HSM curriculum to practical problems and decisions faced by real health care organizations. Students apply techniques of situational assessment, data analysis, strategy development and problem solving. As the capstone course for the HSM program, students are encouraged to integrate and refine their knowledge from all sources of learning in the HSM program to apply to business case studies. They conduct strategic analyses and develop and present strategic recommendations consistent with the mission, vision and values of an organization under the guidance of a teaching team of senior health care managers. The result is an improved ability to think critically, identify strategic challenges, complete strategic analyses for different business problems, and communicate clearly. Prerequisites: HSM-533, 545, 552, 557, 559, 567, 572.

4.00, Classroom | Web Component

HSM-597A Masters Project I

The overall goal of the sequence of these courses is to integrate quantitative methods and health care management knowledge to address a problem that is important to health care delivery, management or policy. In this course, students will design and conduct an applied quantitative research project that results in a high quality, compelling management report and two professional oral presentations to key stakeholders. The key components of this course include integrating and synthesizing information from multiple sources; developing an appropriate research question; developing an appropriate research design and analysis plan; integrating rigorous analytic methods with data management skills to analyze data; and interpreting quantitative or qualitative results in light of the existing literature and best practices to provide new insight for health care management or policy. Prerequisites: HSM-502, 504A&B, 514, 523, 533, 551, 552, 557, and 572.

4.00, Classroom | Web Component

HSM-597B Masters Project II

The overall goal of the sequence of these courses is to integrate quantitative methods and health care management knowledge to address a problem that is important to health care delivery, management or policy. In this course, students will design and

conduct an applied quantitative research project that results in a high quality, compelling management report and two professional oral presentations to key stakeholders. The key components of this course include integrating and synthesizing information from multiple sources; developing an appropriate research question; developing an appropriate research design and analysis plan; integrating rigorous analytic methods with data management skills to analyze data; and interpreting quantitative or qualitative results in light of the existing literature and best practices to provide new insight for health care management or policy. Prerequisites: HSM-502, 504A&B, 514, 523, 533, 551, 552, 557, and 572.

4.00, Classroom | Web Component

HSM-597C Masters Project: Writing for Publication

This elective course is intended for the graduate student who has successfully completed a Master's Project and is ready to prepare a manuscript for publication based on his or her original research. The course will allow the student to learn general guidelines about writing for publication and making decisions about selecting appropriate publication vehicles. The design of this course provides a roadmap for preparing and submitting a manuscript for scholarly publication. Pre-requisites: HSM-597A and HSM-597B

1.00-2.00, Classroom

HSM-598 Integrated Capstone Project

Provides HSM students with the opportunity to work with each other and other Rush graduate students in interdisciplinary teams on complex, multi-dimensional problems in the delivery of patient care and the management of operations at Rush University Medical Center. The students identify alternative approaches to the problem, develop recommendations for organizational change, and prepare an implementation plan. The Rush I-CARE (Innovation, Collaboration, Accountability, Respect and Excellence) values form the basis for student performance assessment at the individual and team levels. The assessment takes into account how the teams accomplish their work as well as the quality of the final product.

2.00, Classroom | Web Component

HSM-601 Cost-Benefit/Cost-Effectiveness Evaluation

The course focuses on cost-effectiveness and cost-benefit analysis, measures of health-related quality of life, technology assessment, resources allocation, and medical decision making. This course is appropriate for those interested in evaluating the cost-effectiveness of health care technologies and medical interventions, and those involved in making clinical policy and resource allocation decisions.

4.00, Classroom

HSM-602 Planning & Improving Operational Effectiveness

This course provides advanced skills in applying operations management techniques to planning and improving operational efficiency. Course applications of simulation, but also includes exposure to other operations management topics such as data mining; TSPI lean six sigma, queuing theory; and linear programming.

3.00, Classroom

HSM-603 Disparities in Healthcare

This course focuses on how to understand, define, and measure health disparities, with an emphasis on ethnic and gender disparities in the United States. Course includes an overview of key measures of health disparity and shows how to calculate them, with a special emphasis on access as well as health insurance concepts such as take-up rates.

3.00, Classroom

HSM-604 Research Methods I: Conducting Systematic Reviews

This course provides an overview of methods for conducting systematic research reviews in healthcare management, including quantitative approaches (e.g. study coding and meta-analysis) and qualitative approaches (e.g. Pawson's 'realist' approach).

3.00, Web Component

HSM-900 Independent Study

Specialized course work designed around the needs of an individual student.

1.00-12.00, Classroom | Web Component

HSM-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

Continuous Enrollment

IMM-505 Basic Immunology

Introduction to immunology with emphasis on basic concepts and principles, interwoven with a study of their clinical applications. Medical students only.

1.00, Classroom | Web Component

IMM-505E Basic Immunology - Exam Makeup

Basic Immunology exam makeup only.

1.00, RMC Exam Makeup

IMM-507 Basic Immunology I

Introduction to immunology, with emphasis placed on the components, nature, and organization of the immune system.

1.00, Classroom

IMM-508 Basic Immunology II

A continuation of Basic Immunology I. This course focuses on activation and regulation of the immune response.

1.00, Classroom

IMM-509 Basic Immunology III

A continuation of Basic Immunology I and II. This course focuses on clinical aspects of the immune response, such as the role in infectious disease and disease mechanisms arising from deficient and exaggerated immune responses.

1.00, Classroom

IMM-510 Advanced Immunology I

Introduction to immunology, with emphasis placed on the components, nature, and organization of the immune system.

4.00, Classroom

IMM-515 Research Seminar

Seminar on contemporary topics in immunology and virology.

1.00, Classroom

IMM-520 Advanced Readings in Immunology, Microbiology and Virology

In this course, students will choose, under the direction of the faculty coordinator, one or more papers from the recent scientific literature, and present it orally to the class. Presentations will provide adequate background to the topic, explanation and assessment of the relevant methodology employed, interpretation of results, discussion of the significance, and validity of the conclusions. Each student will make at least one presentation per quarter. P/N grading only.

1.00, Classroom

IMM-525 Master's Immunology Research

This course is intended for students enrolled in the two-year immunology master's program. It involves laboratory research activities leading to the completion of a research-based manuscript in partial fulfillment of the master's of science degree

1.00-12.00, Laboratory

IMM-525 Master's Immunology Research

This course is intended for students enrolled in the two-year immunology or microbiology master's program. It involves laboratory research activities leading to the completion of a research-based manuscript in partial fulfillment of the master of science degree.

1.00-9.00, Laboratory

IMM-600 Laboratory Rotations

Individual program, acquaints the student with research protocols and interests within the department.

1.00-12.00, Laboratory

IMM-600 Laboratory Rotations

Individual program, acquaints the student with research protocols and interests within the department.

1.00-9.00, Laboratory

IMM-610 Special Topics

Detailed study of contemporary topics in immunology are presented in a five week block. Topics such as inflammation, host defense, membrane structure, and antigen presentation are included.

1.00-12.00, Classroom

IMM-615 Pre-Dissertation Research

Research credits prior to acceptance to doctoral candidacy. (P/N only)

1.00-12.00, Laboratory

IMM-615 Pre-Dissertation Research

Research credits prior to acceptance to doctoral candidacy. (P/N only)

1.00-9.00, Laboratory

IMM-620 Dissertation Research

Research credits after admission to candidacy. (P/N only)

1.00-12.00, Laboratory

IMM-620 Doctoral Research

Research credits after admission to candidacy. (P/N only)

1.00-9.00, Laboratory | Web Component

IMM-900 Independent Study

Specialized course work designed around the needs of an individual student.

1.00-4.00, Classroom | Web Component

IMM-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral

students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

Continuous Enrollment

IS-300 Introduction to Imaging Sciences

This course focuses on specialized imaging sciences modalities. It includes concepts and theories of equipment operations and their integration for medical diagnosis. The student will be introduced to the basics of the available advanced imaging modalities used in the assessment of anatomy and diagnosis of disease processes. This course will provide entry-level students with an overview of diagnostic imaging, technological education and clinical practice.

5.00, Classroom | Web Component

IS-301 Introduction to Patient Care I

Part 1 of 2. An overview of the historical development of radiography and basic radiation protection. An introduction to the many facets of allied health professions, including types of health care professionals, medical ethics, medical terminology, patient assessment, infection control procedures, emergency and safety procedures, communication and patient interaction skills, promoting a safe clinical environment, and basic pharmacology. Topics also include a patient's right to privacy, confidentiality, documentation, team building, cultural issues, age-related concerns, and death and dying. The course textbooks meet the standards set by the American Society of Radiologic Technologists (ASRT) Curriculum Guide and the American Registry of Radiologic Technologists (ARRT) Task List for certification examinations.

5.00, Classroom | Web Component

IS-302 Introduction to Patient Care II

Part 2 of 2. An overview of the historical development of radiography and basic radiation protection. An introduction to the many facets of allied health professions, including types of health care professionals, medical ethics, medical terminology, patient assessment, infection control procedures, emergency and safety procedures, communication and patient interaction skills, promoting a safe clinical environment, and basic pharmacology. Topics also include a patient's right to privacy, confidentiality, documentation, team building, cultural issues, age-related concerns, and death and dying. The course textbooks meet the standards set by the American Society of Radiologic Technologists (ASRT)

Curriculum Guide and the American Registry of Radiologic Technologists (ARRT) Task List for certification examinations.
5.00, Classroom | Web Component

IS-311 Patient Assessment

Fundamentals of assessment will be covered to include the assessment of health status emphasizing cultural, ethnic, and age differences. Focuses on taking patient histories, physical examinations, inspection, palpation, percussion and auscultation. Body systems and functional health patterns are used to organize data and to develop clinical pathways in medical imaging.

5.00, Online Only

IS-312 Pathophysiology I

Provides an in-depth application of the concepts of pathophysiology for the assessment and management of medical imaging patients. Emphasizes the characteristic manifestations, pattern recognition, and image assessment of pathologies observed in medical images. Prerequisite: Admission to the Department.

5.00, Online Only

IS-313 Cross Sectional Anatomy I

A study of sectional anatomy of the transverse, longitudinal, and coronal planes are included for the head, neck, and thorax. Correlation with various imaging methods will be emphasized.

4.00, Univ Nebraska Medical Ctr Course

IS-322 Pathophysiology II

A continuation of IS 312. Provides an in-depth application of the concepts of pathophysiology for the assessment and management of medical imaging patients. Emphasizes the characteristic manifestations, pattern recognition, and image assessment of pathologies observed in medical images.

5.00, Online Only

IS-324 Pharmacology

A study of pharmacodynamics, pharmacokinetics, medication administration, drug categories, and implications in patient care. Emphasizes pharmaceuticals frequently used in medical imaging. This course is intended to provide imaging sciences professionals the knowledge in all aspects of basic pharmacology. The purpose is to educate radiologic personnel in basic pharmacology principles, therefore ensuring quality patient care. Prerequisite: Admission to the Department.

4.00, Online Only

IS-326 Vascular Interventional Technology I

This didactic course includes instruction over: the history of Angiography, medical and legal implications of angiographic

procedures, pharmaceuticals and contrast agents used in interventional radiology, patient care procedures, quality control, angiographic equipment, and image enhancement techniques. The course encourages students to combine theoretical knowledge with the practical experience they acquire while working in these clinical areas. Learning activities for this course review and build upon pre-existing knowledge, such as human anatomy, physiology, pathology, patient care in radiography, and radiation protection.

5.00, Univ Nebraska Medical Ctr Course

IS-327 Vascular Interventional Technology II

Continuation of IS 326. This didactic course includes instruction over: the history of Angiography, medical and legal implications of angiographic procedures, pharmaceuticals and contrast agents used in interventional radiology, patient care procedures, quality control, angiographic equipment, image enhancement techniques. This didactic course includes instruction over: procedural angiography including; imaging of the heart, pulmonary vascular system, thoracic aorta, central venous access procedures, cardiac-interventional, vascular-interventional, and nonvascular interventional procedures. The course encourages students to combine theoretical knowledge with the practical experience they acquire while working in these clinical areas. Learning activities for this course review and build upon pre-existing knowledge, such as human anatomy, physiology, pathology, patient care in radiography, and radiation protection. Prerequisite: Admission to the Department.

5.00, Classroom

IS-331 Education

An introduction to basic principles and techniques used in Imaging Sciences education. Topics include: patient education, in-service education, course design, objectives, lesson plan development, learning activities, use of media, development of presentations, testing and evaluation.

5.00, Univ Nebraska Medical Ctr Course

IS-332 Management

Management principles and problems as they relate to Imaging Sciences and the management of the department, hospital, service organization, and health care programs will be discussed

3.00, Online Only

IS-334 Computed Tomography Positioning and Protocols

This course will include both lectures and lab demonstrations of CT patient screening, preparation, and positioning. This course will include a review of x-ray physics, instrumentation, and

safety along with new information related to CT instrumentation, relevant anatomy, and pathology. Students enrolled in this course will present case studies related to specific anatomy or CT protocols; discuss a variety of CT parameters including FOV, Pitch, kVp, mAs, etc.; describe and demonstrate patient care concepts; describe and demonstrate taking an accurate patient history; utilize appropriate medical terminology; demonstrate an understanding of human anatomy, physiology, and pathology; discuss and describe patient safety as it relates to CT procedures and x-ray radiation; describe iodinated contrast agents and discuss related safety issues; describe liability and legal issues related to CT technologists; describe and discuss CT protocols and protocol development.

3.00, Online Only

IS-335 Advanced Radiation Biology

This course utilizes a qualitative and quantitative approach to study the effects of ionizing and non-ionizing radiation upon life systems with special emphasis upon the human population.

3.00, Univ Nebraska Medical Ctr Course

IS-336 Introduction to MRI

This introductory course is designed to provide students with an introduction to the basic underpinnings of MRI. Students enrolled in this course will: describe the history of MRI including fundamental scientific discoveries; learn about the individuals who have made significant contributions to MRI; define and discuss Nuclear Magnetic Resonance; define the term Free Induction Decay; explain how Fourier transformation is used in MRI; define and discuss k-space; describe basic pulse sequences and their applications; diagram a T2 curve and a T1 curve; list the 3 primary type of MRI systems currently in use; define, describe, and discuss safety as related to MRI (patient safety, and facility safety); and critique MR images and evaluate for artifact, technique, and diagnostic quality.

3.00, Online Only

IS-441 Computed Tomography Physics

This course will provide a comprehensive overview of the physics and basic theory of operation of computerized tomography.

Topics covered include: historical perspectives, computing and digital image processing concepts, principles, data acquisition, and spiral-helical scanning, image reconstruction, image quality, radiation dose, quality control, artifacts, and specialty exams.

Prerequisite: RSTE Advisor approval.

2.00, Univ Nebraska Medical Ctr Course

IS-441 Computed Tomography Physics

Computerized Tomography (CT) is a specialized modality of the Diagnostic Imaging section. This course is designed to provide

an in-depth understanding of the physical and instrumentation involved in concepts of CT. The historical development and evolution of CT is reviewed. Physics topics include x-radiation in forming the CT image, CT beam attenuation, linear attenuation coefficients, tissue characteristics and Hounsfield number application. Data acquisition and manipulation techniques and image reconstruction algorithms will be explained. This course will also provide students with fundamental physical principles, quality control and instrumentation needed. Students will follow weekly modules and/or use textbook and Internet resources to learn CT principles. Students will participate online with other students.

3.00, Online Only

IS-442 Radiologic Contrast Agents

This course presents the physical principles of contrast media related to imaging, the physical and chemical properties of contrast media solutions, the pharmacokinetics of contrast media, physiologic actions of contrast media, contrast-related nephrotoxicity, mechanisms of contrast media reactions, and the economic and legal issues involving contrast media.

2.00, Univ Nebraska Medical Ctr Course

IS-443 MRI Positioning & Protocols I

This course will include both lectures and lab demonstrations of MRI patient screening, preparation, positioning, MRI instrumentation, and technical knowledge. Students enrolled in this course will gain an understanding of MRI protocols. Lectures will include information related to the use, advantages, disadvantages, and compatibility issues related to user selectable parameters and scan options. The MRI protocols course will also include lectures related to anatomy of the brain, spine, chest, abdomen, and pelvis. Students enrolled in this course will: present case studies related to specific anatomy or MRI protocols; discuss a variety of MRI parameters including TE, TR, IR, NSA, Matrix, etc.; describe and demonstrate patient care concepts; describe and demonstrate taking an accurate patient history; utilize appropriate medical terminology; demonstrate an understanding of human anatomy, physiology, and pathology; discuss and describe patient safety related to MRI procedures; discuss MRI contrast agents and safety issues; describe liability and legal issues pertaining to MRI technologists.

3.00, Online Only

IS-445P Clinical Practicum I

Supervised clinical experience in the imaging track selected.

5.00, Practicum

IS-446 Clinical Seminar I

Case presentations are required to integrate clinical practice and theory. Review of medical imaging with an emphasis on problem

solving and critical thinking in the imaging track selected. Students will develop a research proposal in the imaging sciences.
3.00, Online Only

IS-450 MRI Physics

This course is intended to provide a comprehensive overview of the physics and theory of operation of magnetic resonance imaging systems. This course is offered to students enrolled in the radiation science technology program as well as radiologic technologists, medical students, and as a refresher course for radiology residents. Students enrolled in this course will: define, describe, and discuss the safety issues related to MRI; describe the physical components that comprise an MRI scanner; review basic physics and mathematics related to MRI; discuss the EM Spectrum and its importance to MRI procedures; define and describe vectors and diagram the Net Magnetic Vector; define precession; state and discuss the Larmor equation; describe natural frequency and the principles of resonance; state the work problems using the scan time formula; describe, define, and discuss MRI pulse sequences and their clinical applications; evaluate timing diagrams for MRI pulse sequences; discuss MRI instrumentation; describe and define MRI artifacts and their avoidance; and list and apply MRI scan parameters.
3.00, Online Only

IS-450L MRI Physics Lab

This course is intended to provide hands-on experience applying the concepts taught in IS-450 MRI Physics. This laboratory course will provide students an opportunity to see the physics of MRI in a 'live' setting. Students will perform experiments related to: T1 relaxation; T2 relaxation; demonstrate a free induction decay signal; 1 dimensional, 2 dimensional, and 3 dimensional imaging concepts; scan time and user selectable MRI options/parameters; signal to noise ratio and image quality; image optimization; and patient care and safety.
2.00, Univ Nebraska Medical Ctr Course

IS-451 Sectional Anatomy & Pathology I

Sectional Anatomy, Pathology, and Physiology as it relates to CT/MRI images will be covered. Basic terminology, instrumentation, and safety of CT and MRI will be included. This is the first semester of a two-semester course. Prerequisite: Advisor approval.
6.00, Online Only

IS-452 Health Care Ethics Critical Thinking

This upper level course introduces ethical issues that Allied Health professionals can expect to encounter during their

education and career. It covers such areas of concern as confidentiality, informed consent, responsible practice, professionalism, cultural differences, handling mistakes, difficult cases, and key legal aspects of these issues. To assist students in resolving issues, the course identifies and applies key principles of critical thinking. The course trains students in the use of these principles in ethics and professionalism. The course is designed to improve the ability of students to reason soundly in professional ethics, to be familiar with the health professional ethics literature, and to communicate clearly about ethical values, integrity, and judgment.
5.00, Online Only

IS-455P Clinical Practicum II

Supervised clinical experience at the intermediate level in the imaging track selected.
5.00, Practicum

IS-456 Clinical Seminar II

Case presentations are required to integrate clinical practice and theory. Review of medical imaging with an emphasis on problem solving and critical thinking in the imaging track selected. Students will gather data for their research project in the imaging sciences.
3.00, Online Only

IS-461 Sectional Anatomy/Pathology II

This is a continuation of Sectional Anatomy, Pathology, and Physiology as it relates to CT/MRI imaging.
6.00, Univ Nebraska Medical Ctr Course

IS-465P Clinical Practicum III

Supervised clinical experience at the advanced level in the imaging track selected.
5.00, Practicum

IS-466 Clinical Seminar III

Case presentations are required to integrate clinical practice and theory. Review of medical imaging with an emphasis on problem solving and critical thinking in the imaging track selected. Students will write the rough draft of their research report in the imaging sciences
3.00, Online Only

IS-471P Clinical Practicum IV

Supervised clinical experience at the leadership level in the imaging track selected.
5.00, Practicum | Web Component

IS-473 MRI Positioning/Protocols II

This course is a continuation of IS-443 MRI Positioning and Protocols I. It includes advanced MRI techniques. This course will cover the following topics; Functional MRI, Fetal MRI, Breast MRI, Special Abdominal MRI, Cardiac MRI, MRI Spectroscopy, and MR Angiography. Prerequisite: IS-443
2.00, Online Only

IS-473 MRI Positioning/Protocols II

This course is a continuation of IS-443 MRI Positioning and Protocols I. Magnetic Resonance Imaging (MRI) is a specialized modality of the Diagnostic Imaging section. This course is designed to provide an understanding of proper protocols and positioning utilized to acquire appropriate imaging with patient history in mind concepts of MRI. Anatomy and pathophysiology is reviewed for appropriate protocol and contrast usage. Protocol and positioning topics include basic overview of MRI physics, patient communication and MRI safety, indications for procedure, preparation, orientation of MRI room, positioning and landmarks, patient history and assessment, types of contrast media and their usage, and scan parameters. MRI protocols vary from site to site and most often are dependent on radiologist's preference. Students will follow weekly modules and/or use textbook and Internet resources to learn MRI protocols and positioning. Students will participate online with other students.
3.00, Online Only

IS-481P Clinical Specialty Practicum

Supervised clinical experience in the imaging track selected. This course is designed so the student gains the clinical experience needed to function in an active imaging sciences department and to document the needed clinical procedures. The clinical specialty practicum will consist of 200 hours in an assigned facility for supervised practice of acquired knowledge and skills.
5.00, Practicum

IS-490 Cultural Competency & Communication

Communication and Cultural Competency is an upper-level course for allied health professions students to facilitate understanding of the role of cultural competence in the healthcare arena and explore the ethical and legal implications of this topic. The course will begin by helping the student understand the value of diversity in our society. Secondly, the course will allow the student to make self-examination of their own beliefs, values and biases. This will be followed by understanding the dynamics involved when two cultures interact. Students will examine specific cultural characteristics as they apply to health care and propose ways of adapting diversity to the delivery of healthcare. The course will include an in-depth assessment of

the CLAS standards and cultural competency information available to healthcare organizations.
3.00, Univ Nebraska Medical Ctr Course

IS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
1.00, Continuous Enrollment

MED-501 Clinical Pathophysiology I

Serving as a bridge between the basic sciences and clinical medicine the course helps to make the student conversant with the limits of biochemical and physiologic responses under a variety of stresses and disease states. Emphasis is in three basic areas: abnormal, general cellular biology; homeostasis; and organ system pathophysiology. The course closely coordinates with topics in the pathology, pharmacology, and psychopathology courses and also with didactic material to be presented during the third-year clinical program.
1.00, Classroom | Web Component

MED-502 Clinical Pathophysiology II

Serving as a bridge between the basic sciences and clinical medicine the course helps to make the student conversant with the limits of biochemical and physiologic responses under a variety of stresses and disease states. Emphasis is in three basic areas: abnormal, general cellular biology; homeostasis; and organ system pathophysiology. The course closely coordinates with topics in the pathology, pharmacology, and psychopathology courses and also with didactic material to be presented during the third-year clinical program.
1.00, Classroom | Web Component

MED-503 Clinical Pathophysiology III

Serving as a bridge between the basic sciences and clinical medicine the course helps to make the student conversant with the limits of biochemical and physiologic responses under a variety of stresses and disease states. Emphasis is in three basic areas: abnormal, general cellular biology; homeostasis; and organ system pathophysiology. The course closely coordinates with topics in the pathology, pharmacology, and psychopathology

courses and also with didactic material to be presented during the third-year clinical program.

1.00, Classroom | Web Component

MED-503E Clinical Pathophysiology III-Exam Makeup

Clinical Pathophysiology III exam makeup only.

1.00, RMC Exam Makeup

MED-701 Core Clerkship: Internal Medicine

The clerkship in Internal Medicine is designed to introduce students to the study and skills of clinical medicine. Through the case study approach, students have the opportunity to evaluate and manage a variety of patients and their problems. In this manner, students can develop their skills in history taking and physical examination and will review pathophysiological principles in caring for patients. Students will develop an understanding of relationships between disease states and patient hosts from the medical, social and emotional points of view. The ward team approach allows students the opportunity to actively work toward the goals of good patient care and the acquisition of a solid foundation of medicine. Students are expected to supplement their learning through a self-study program of learning objectives. This will provide the students with exposure to basic technical skills as well as a core set of topics in Internal Medicine.

12.00, Clinical | Web Component

MED-701M Core: Medicine Mini-Board

Students function at an advanced level, doing histories and physical examinations, diagnostic evaluations, and initiation of appropriate therapy. There is close supervision by the staff of the Department of Internal Medicine. The course is primarily intended for students desiring additional clinical experience in internal medicine. Prerequisites: MED 701.

4.00-12.00, Clinical

MED-701W Core Medicine Clinical Remediation

Students function at an advanced level, doing histories and physical examinations, diagnostic evaluations, and initiation of appropriate therapy. There is close supervision by the staff of the Department of Internal Medicine. The course is primarily intended for students desiring additional clinical experience in internal medicine. Prerequisites: MED 701.

12.00, Clinical

MED-703 Core Clerkship: Internal Medicine

The clerkship in Internal Medicine is designed to introduce students to the study and skills of clinical medicine. Through the case study approach, students have the opportunity to evaluate and manage a variety of patients and their problems. In this manner, students can develop their skills in history taking and physical

examination and will review pathophysiological principles in caring for patients. Students will develop an understanding of relationships between disease states and patient hosts from the medical, social and emotional points of view. The ward team approach allows students the opportunity to actively work toward the goals of good patient care and the acquisition of a solid foundations of medicine. Students are expected to supplement their learning through a self-study program of learning objectives. This will provide the students with exposure to basic technical skills as well as a core set of topics in Internal Medicine.

8.00, Clinical | Web Component

MED-710 Internal Medicine Subinternship

Students function at an advanced level, doing histories and physical examinations, diagnostic evaluations, and initiation of appropriate therapy. There is close supervision by the staff of the Department of Internal Medicine. The course is primarily intended for students desiring additional clinical experience in internal medicine. The four (4) week subinternship rotation is taken during the fourth year. This clerkship will be scheduled during the elective lottery, which takes place in the spring of the M3 year.

4.00, Clinical | Web Component

MED-711 Cardiovascular Medicine

Includes the study of the diagnostic spectrum of cardiac evaluation including bedside assessment, critical care cardiology, electrocardiography, electrophysiology, echocardiography, cardiac catheterization, coronary angiography, coronary care, interventional cardiology, preventive cardiology and exercise testing. Patient study is carried out under the direction of the clinical staff.

4.00, Clinical

MED-711X Cardiovascular Medicine

Includes study of the diagnostic spectrum of cardiac evaluation including bedside assessment, critical care cardiology, electrocardiography, electrophysiology, echocardiography, cardiac catheterization, coronary angiography, coronary care, interventional cardiology, preventive cardiology and exercise testing. Patient study is carried out under direction of the clinical staff. This rotation is not offered in July. Prerequisites: MED 701.

4.00, Clinical

MED-712 Medical Intensive Care (MICU)

This course provides experience in the recognition and management of medical critical care issues, particularly the use of bedside hemodynamic monitoring, use of mechanical ventilators, and management of cardiovascular, pulmonary, renal and endocrine emergencies. Patient care is carried out under the direction of the clinical staff.

4.00, Clinical

MED-713 Cardiovascular Research

The student's program is individually planned with emphasis on understanding basic research techniques and completion of a project with the goal of submitting an abstract and/or manuscript. The student will be assigned to a specific faculty member based on his/her individual interest. The research program of the Section of Cardiology encompasses treatment and prevention of chronic heart failure, arrhythmias, and coronary artery disease; echocardiography; myocardial cell contraction; molecular biology of heart cell differentiation; and vascular biology. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

MED-716 Poison Control

The Illinois Poison Center is a 24-hour emergency service fielding approximately 90,000 calls a year from parents, schools, work sites, emergency rooms, occupational medicine clinics, etc., regarding a variety of toxicological emergencies. The student will learn the basics in management of a poisoned or overdosed patient, including decontamination of toxins via all routes (i.e., ingestion, ocular/dermal, and inhalation). The student will gain a working knowledge of signs/symptoms, antidotal therapy, toxicologic laboratory, nomogram interpretation monitoring parameter and management appropriate to a variety of poisons including prescription and OTC medicines, household products, and plants. Students will attend morning rounds and case conferences at the Toxikon Group at John H. Stroger Jr. Hospital of Cook County or the UIC College of Medicine at 9:00 a.m. Students will then commute to the IPC and work on the emergency telephone lines under supervision of IPC staff until 4:00 p.m.

2.00-4.00, Clinical

MED-721 Endocrinology/Metabolism

Endocrine and metabolic disorders are studied under the direction of the clinical faculty. Regular didactic sessions, departmental conferences and seminars supplement clinical work, which involves both outpatients and inpatients.

4.00, Clinical

MED-721X Endocrinology/Metabolism-Away

Endocrine and metabolic disorders are studied under the direction of the clinical faculty. Regular didactic sessions,

departmental conferences and seminars supplement clinical work, which involves both outpatients at John H. Stroger, Jr. Hospital of Cook County and Rush and inpatients at Rush. Prerequisite: MED 701.

4.00, Clinical

MED-724 Coronary Care Unit

This clerkship is designed for senior medical students desiring advanced exposure to patients with acute cardiovascular illness. During this rotation the student will function at the sub-intern level and will be expected to admit anywhere from one to three patients per day. Although night call is not required, it is expected that the student remain until their work is fully completed and sign-out given to the intern on-call. The student then will give formal presentations of patient histories and physicals at morning rounds which occur in the CCU conference room between the hours of 8:00 a.m. and 12:00 Noon. It will be expected that the student be available for admitting and rounding six days out of seven. The student will also be exposed to the full spectrum of bedside procedures performed in the coronary care unit including pulmonary artery catheterization, indwelling arterial line, and venous central catheter. Exposure to placement of transvenous pacemakers and intraaortic balloon pumps will also be part of the CCU experience. It is anticipated that the experience in the coronary care unit be rigorous. At the conclusion of the rotation the student should be able to understand the diagnosis and treatment of the full spectrum of cardiovascular illnesses including ischemic heart disease, advanced heart failure, shock, hypertensive heart disease, valvular heart disease, congenital heart disease and pericardial disease. The student will also gain valuable experience in the diagnosis and treatment of rhythm disturbances and in 12-lead electrocardiogram interpretation. The student will be responsible for all aspects of patient care under the supervision of the physician team which includes a full-time Cardiovascular Attending Physician, a Cardiovascular Fellow, as well as Internal Medicine Residents and Interns. It is also expected that the student participate in didactic conferences and attend all the Cardiology conferences throughout their rotation. This clerkship is recommended for students intending to enter a career in Internal Medicine, the Internal Medicine Subspecialties or Critical Care Medicine.

2.00-4.00, Clinical

MED-726 Nephrology

The clinical diagnosis and management of patients with acute and chronic renal disease as well as various fluid, acid-base, and electrolyte abnormalities are studied. In addition, the course is directed toward the proper interpretation of pathophysiologic findings and the practical clinical management of nephrotic

syndrome, diabetic nephropathy, glomerulonephritis and patients with chronic renal failure and end-stage renal disease.
4.00, Clinical

MED-732 Digestive Diseases

The 4-week rotation in Digestive Diseases is divided into two 2-week sessions; Gastroenterology and Hepatology. Students rotate on the Rush gastroenterology and hepatology inpatient services including liver transplant. Students actively participate in consults, didactic lectures and bedside rounds. Students attend all conferences including Gastroenterology Grand Rounds, conference, Liver Transplant conference and Journal Club. An outpatient experience in both gastroenterology and hepatology is available once per week if desired. There is an optional opportunity for those students wishing to participate in clinical research in the area of digestive diseases to incept projects during this rotation.

4.00, Clinical

MED-732X Digestive Diseases-Away

The rotation is divided into two-week sessions; Gastroenterology and Hepatology. Students rotate on the Rush gastroenterology and hepatology inpatient services, including liver transplant. Students actively participate in consults, didactic lectures and bedside rounds. Students attend all conferences including Gastroenterology Grand Rounds, Medical-Surgical conference, Liver Transplant conference and Journal Club. An outpatient experience in both gastroenterology and hepatology is available once per week, if desired. There is an optional opportunity for those students wishing to participate in clinical research in the area of digestive diseases to incept projects during this rotation. Prerequisites: MED 701.

4.00, Clinical

MED-736 Hematology

This course provides an intensive exposure to clinical hematology. Students meet with residents, fellows and a teaching-attending hematologist daily for presentation and discussion of hospitalized hematology patients. Students work-up patients, present them to the attending and participate in patient care with medical residents. Blood and bone marrow slides on the service patients are reviewed daily with attending hematologists using a teaching (multi-headed) microscope. Bedside rounds follow the daily presentation of cases. On Mondays, a multidisciplinary lymphoma conference presents diagnostic and therapeutic aspects of the malignant lymphomas. On Thursdays, a clinical conference is held in which a patient is presented and discussed in depth by students, residents and faculty. A recent addition to this elective is a daily self-learning session with a faculty member on a core topic of hematology. Twenty of these topics cover

the spectrum of hematologic diseases. All conferences held by the Section of Hematology and Stem Cell Transplantation is available to the students on an optional basis.

4.00, Clinical

MED-746 Infectious Disease

Students are exposed to a wide variety of acute and chronic Infectious Disease problems with emphasis on diagnostic and therapeutic approaches. Teaching is conducted in a case-study format in which students see new patients and present them to the attending on consultation rounds. Rush and Stroger Hospitals have a joint fellowship Training Program in Infectious Disease. Rush students will spend two weeks at Rush and two weeks at John H. Stroger, Jr. Hospital of Cook County on the respective Infectious Disease Consultative Services; visiting students will spend all four weeks at Rush. In addition, students will attend a weekly two-hour infectious disease conference at Rush and a one-hour infectious disease conference at Stroger where they may present cases. Sixteen lectures on basic infectious disease topics are presented over the four weeks. Students will NOT be allowed to drop the clerkship less than 8 weeks prior to the start.

4.00, Clinical

MED-747 Global and Community Health

For the Global and Community Health elective, students spend between 2 and 4 weeks in a specific community defined by the student. The purpose of this elective is to provide students the opportunity to read and discuss in the area of Primary Health Care, as defined by the World Health Organization (1978). Students will obtain a framework for addressing common diseases in an underserved community setting from a clinical, epidemiologic and public health perspective. In addition to the didactic portion of the course the student will spend 2-4 weeks in an underserved community developing country setting under the supervision of Rush faculty. The course will focus on the social determinants of population health, including the impact of environment, poverty, social structure and culture on health status and health care. The course will include on the epidemiology, diagnosis, treatment, control, and prevention of selected diseases of importance in underserved settings. Students will use this knowledge to develop a plan for working in disadvantaged communities providing primary health care, either locally or internationally. Students must have a faculty sponsor at Rush as well as a physician at the site responsible for supervision of the student's work. Students must complete the on-line curriculum and reading self study prerequisites prior to departure for their work in the community and must submit a completed project within 1 week of the completion of the elective.

2.00-4.00, Classroom

MED-751 Rheumatology

Students participate in all activities of the Section of Rheumatology, including patient care in clinics, inpatient consultations, conferences and didactic sessions. A wide variety of musculoskeletal conditions and connective tissue diseases are seen. Objectives include performance of musculoskeletal exam, synovial fluid analysis, arthrocentesis, therapeutic injection of joints and other structures, ability to formulate differential diagnosis of rheumatic conditions, and formulate long-term management programs. An interdisciplinary approach relies on contributions of immunology, orthopedics, diagnostic radiology, physiotherapy, and occupational therapy. The combined faculty and facilities of Rush Medical Center and John H. Stroger Jr. Hospital of Cook County are utilized.

4.00, Clinical

MED-751X Rheumatology-Away

Students participate in all activities of the Section of Rheumatology, including patient care in clinics, inpatient consultations, conferences and didactic sessions. A wide variety of musculoskeletal conditions and connective tissue diseases are seen. Objectives include performance of musculoskeletal exam, synovial fluid analysis, arthrocentesis, therapeutic injection of joints and other structures, ability to formulate differential diagnosis of rheumatic conditions, and formulate long-term management programs. An interdisciplinary approach relies on contributions of immunology, orthopedics, diagnostic radiology, physiotherapy, and occupational therapy. The combined faculty and facilities of Rush University Medical Center and John H. Stroger, Jr. Hospital of Cook County are utilized. Prerequisites: MED 701.

4.00, Clinical

MED-755 Quality & Safety in the Hospital

Students will be assigned to the RUMC Attending Directed service and assume primary responsibility for patient care under close supervision, provided by an assigned attending hospitalist. Students will be afforded the unique opportunity to work one-on-one with an attending hospitalist, and will interface with case management, physical therapy, pharmacy, nursing, primary care physicians outside of the hospital, emergency medicine and critical care physicians and medical/surgical consultants to provide high-quality and safe inpatient care. Students will participate in a series of workshops and didactic sessions addressing important topics in quality improvement and patient safety.

4.00, Clinical

MED-761 Medical Oncology

Patients seen by the Section of Medical Oncology provide an ample and varied spectrum of oncological problems. Students study selected patients under the direction of members of the

section. Various therapeutic approaches and complications occurring in the course of the disease are discussed. The program stresses the importance of the combined interdisciplinary approach using the resources of the Departments of Surgery and Therapeutic Radiology, as well as those of Pathology and Nuclear Medicine. Students will have the opportunity to participate in the teaching programs of the Medical Oncology Ward on 11 Kellogg.

4.00, Clinical

MED-771 Pulmonary Medicine

The elective will give the student an exposure to the diagnosis and management of patients with a wide variety of pulmonary disorders. The rotation concentrates primarily on in-patients at Rush University Medical Center, but there is an opportunity to work with out-patients in the Rush Center for Lung Diseases. The essentials of pulmonary physiology, the use and interpretation of pulmonary function testing, and the provision of mechanical ventilatory support are emphasized during the rotation.

4.00, Clinical

MED-771X Pulmonary Medicine-Away

Students are exposed to the diagnosis and management of patients with a wide variety of pulmonary disorders. The essentials of pulmonary physiology, the use and interpretation of pulmonary function testing, and the provision of mechanical ventilatory support are emphasized. Prerequisites: MED 701, SUR 701.

4.00, Clinical

MED-777 Allergy/Immunology

This elective teaches the clinical approach to the problems of allergy, other immune-mediated diseases and immunodeficiency in children and adults. Diagnosis and treatment of commonly encountered IgE-mediated diseases (allergic rhinitis, asthma, eczema and urticaria), as well as connective tissue diseases and immunodeficiency syndromes are explained. Rotators are responsible for following medicine as well as pediatric inpatient consults at RUMC and Stroger Hospitals and report to the attending physician-on-service for daily rounds. Allergy/Immunology outpatient care is demonstrated at Fantus Clinic (part of the Stroger Hospital Ambulatory Care Network) as well as the Allergy/Immunology Office at Rush University Medical Center. Rotators also learn about skin testing techniques, spirometry, and immunological tests performed by the Rush Medical Laboratory. Teaching (basic science or clinical lecture, journal club, research and chart review) conferences are held at Rush on Friday mornings. The attending physician-on-service and/or fellow-on-service also teach on daily rounds. A pretest and final quiz are given to measure achievement as a basis for evaluation.

4.00, Clinical

MED-781 Research in Medicine

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

MED-785 Community-Based Intensive Care Unit

This community-based intensive care experience is offered at Rush-Copley Medical Center in Aurora. Students will learn to recognize critically ill patients' presentation and natural history, identify proper treatment of critical illness, and become familiar with typical critical care procedures. They will also learn the process of multidisciplinary rounds in a community ICU.

2.00-4.00, Clinical

MED-795 Geriatric Medicine

The elective in Geriatric Medicine and Palliative Care draws upon a number of resources within the Rush system, including Rush University Senior Care and its practice sites and Johnston R. Bowman Health Center. Students will learn about models of care for older adults throughout the continuum of medical care. Under the supervision of the faculty of the section of Geriatric Medicine and Palliative Care, students will participate as part of an interdisciplinary team in evaluation and assessment of the medical, psychiatric, and social needs of older adults. The curriculum includes exposure to topics in medical ethics, medical economics, and medical and legal aspects of end-of-life care. Weekly didactic sessions presented by section faculty complement clinical experiences. This elective requires the course director's approval.

2.00-4.00, Clinical

MED-796 Mindfulness Practice in Clinical Care

Mindfulness Based Stress Reduction is a curriculum taught for the last 33 years that teaches skills, drawn largely from

mindfulness (or insight) meditation traditions, that: promote the capacity for holding experience in non-judgmental awareness; and cultivates patience, compassion (to self and other), clarity during moments of emotional distress, quicker resolution of stress reactivity, and creative responses to stressors. This has been taught to, and researched, in (among other cohorts) persons with medical symptoms and chronic diseases, and medical students. MBSR, or a variation of MBSR, is a part of most University based Integrative Health programs. In "Mindfulness Practice in Clinical Care", we will teach the MBSR curriculum in the first "trimester", then apply what has been learned in a way to learn to attend to suffering in effective ways during clinical encounters.

2.00, Clinical

MED-799 Combined Internal Medicine/Pediatrics

This elective is based at Lifetime Medical Associates, the continuity practice of the Rush Combined Internal Medicine/Pediatrics Residency Program. This integrated resident-faculty outpatient practice focuses on family-oriented primary care. Students spend the day working with common outpatient problems in patients of all ages. In addition, students will gain experience in office management, insurance issues, quality improvement, urgent care, and other areas important to general practice. Because this elective is essentially an outpatient subinternship, we request that students advise us as soon as possible of a need to change dates or cancel this elective. NOTE: Visiting students may only enroll in four-week rotations with the approval of the course director; they are not eligible for two-week rotations. Rush students who are interested in a 2-week rotation should contact the Office of Medical Student Programs to enroll.

4.00, Clinical

MED-7EI Internal Medicine Elective

Students may receive credit for an individually arranged elective with a Rush faculty member. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Education before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements. Elective

4.00, Clinical

MED-812 Medical Intensive Care (MICU)

This course provides experience in the recognition and management of medical critical care issues, particularly the use of bedside hemodynamic monitoring, use of mechanical ventilators, and management of cardiovascular, pulmonary, renal and endocrine emergencies. Patient care is carried out under the direction of the clinical staff.

4.00, Clinical

MED-815 Clinical Palliative Care

The student will see patients referred to the palliative care service in the inpatient, outpatient and home setting. The service sees 50 patients/month in the inpatient setting; 10-15/week in the outpatient clinic; and 2-3 patients/week at home. The student will be involved in a selected number of these patients. Palliative Medicine fellows provide teaching to the residents and medical students rotating on the service both formally during didactic sessions, as well as serving as role models during direct patient care interactions and family meetings.

2.00, Classroom

MED-821 Endocrinology/Metabolism

Endocrine and metabolic disorders are studied under the direction of the clinical faculty. Regular didactic sessions, departmental conferences, and seminars supplement clinical work, which involves both outpatients and inpatients.

4.00, Clinical

MED-826 Nephrology

The clinical diagnosis and management of patients with acute and chronic renal disease as well as various fluid, acid-base, and electrolyte abnormalities are studied. In addition, the course is directed toward the proper interpretation of pathophysiologic findings and the practical clinical management of nephrotic syndrome, diabetic nephropathy, glomerulonephritis and patients with chronic renal failure and end-stage renal disease.

4.00, Clinical

MED-828 Cardiology

This rotation consists of two weeks of CCU and two weeks of inpatient cardiology consults, or four weeks of CCU. Each student can choose which of the two formats they prefer. Students will see patients on their own and present/discuss them with the team. They will attend cardiology rounds and conferences. Students will improve their knowledge about the presentation and treatment of common cardiac diseases including: chest pain, acute coronary syndrome, arrhythmias. Students will improve their skills in the cardiac examination and in the interpretation of EKGs. There is a daily half-hour teaching

conference for the team. Students have the option of staying for an additional hour long conference geared towards the fellows. Students are invited to attend any conferences for the department of medicine residents (noon conferences three days per week). Evaluation will be based on the student's performance on rounds. Expectations will be discussed on the first day of the clerkship, and feedback will be ongoing.

4.00, Clinical

MED-832 Digestive Diseases

The 4-week rotation in Digestive Diseases is divided into two 2-week sessions; Gastroenterology and Hepatology. Students rotate on the Rush gastroenterology and hepatology inpatient services including liver transplant. Students actively participate in consults, didactic lectures and bedside rounds. Students attend all conferences including Gastroenterology Grand Rounds, conference, Liver Transplant conference and Journal Club. An outpatient experience in both gastroenterology and hepatology is available once per week if desired. There is an optional opportunity for those students wishing to participate in clinical research in the area of digestive diseases to incept projects during this rotation.

4.00, Clinical

MED-836 Hematology

This course provides an intensive exposure to clinical hematology. Students meet with residents, fellows and a teaching-attending hematologist daily for presentation and discussion of hospitalized hematology patients. Students work-up patients, present them to the attending and participate in patient care with medical residents. Blood and bone marrow slides on the service patients are reviewed daily with attending hematologists using a teaching (multi-headed) microscope. Bedside rounds follow the daily presentation of cases. On Mondays, a multidisciplinary lymphoma conference presents diagnostic and therapeutic aspects of the malignant lymphomas. On Thursdays, a clinical conference is held in which a patient is presented and discussed in depth by students, residents and faculty. A recent addition to this elective is a daily self-learning session with a faculty member on a core topic of hematology. Twenty of these topics cover the spectrum of hematologic diseases. All conferences held by the Section of Hematology and Stem Cell Transplantation is available to the students on an optional basis.

4.00, Clinical

MED-847 Infectious Disease Externship

As externs on the Infectious Disease inpatient ward, students will act as daily care providers for newly admitted patients with HIV/AIDS, most of whom have opportunistic infectious and/or

malignancies requiring in-hospital diagnostic evaluation and therapy. Students will participate in daily multi-disciplinary team rounds that include an Infectious Disease attending, Medicine house staff, clinical pharmacist, and physician assistants (PA'S). Students also may spend one-half day per week in the outpatient HIV clinic under the supervision of an Infectious Disease physician. Didactic sessions include a weekly one-hour Infectious Disease conference conducted at the Core Center, a two-hour clinical Infectious Disease conference held at Rush, and 12 lectures on HIV-related topics. Exposure to the microbiology lab takes place during which the following topics are reviewed; HIV Testing, Blood Cultures, Mycobacterial Testing, Susceptibilities. 4.00, Clinical

MED-848 HIV Primary Outpatient Care

The CORE Center provides comprehensive outpatient Infectious Disease services. Founded by Rush and the County of Cook, the Center is operated by the Cook County Bureau of Health Services. Students will learn about HIV primary care including HIV counseling and testing; prevention, diagnosis, and treatment of opportunistic infections; and antiretroviral therapy. Experiences will include adult, adolescent and pediatric HIV clinics, and brief exposure to a walk-in sexually transmitted disease clinic, and specialists in HIV dental, renal, cancer, hematology, and neurology specialty care, as well as mental health, social work, and chemical dependency support services. Didactic sessions include a one-hour weekly Infectious Diseases conference at the Core Center and a 2-hour clinical conference at Rush. 4.00, Clinical

MED-850 Short Stay Telemetry Elective

Students will get to see patients on their own and go over their presentations with senior residents and attending staff. CXRs and EKGs are also reviewed with the attending staff. Students will be exposed to the presentation and management of patients with chest pains, acute coronary syndromes as well as congestive heart failure and various arrhythmias. All patient orders will be supervised and co-signed by the house staff. Students will usually see 2 patients daily and follow their patients for the ~ 48hr stay while they are on the observation unit. Students will be based on the telemetry units from Mon- Fri between the hours of 8am - 6pm. 4.00, Clinical

MED-851 Rheumatology

Students participate in all activities of the Section of Rheumatology including patient care in clinics, inpatient consultations, conferences and didactic sessions. A wide variety of musculoskeletal conditions and connective tissue diseases are

seen. Objectives include performance of musculoskeletal exam, synovial fluid analysis, arthrocentesis, therapeutic injection of joints and other structures, ability to formulate differential diagnosis of rheumatic conditions, and formulate long-term management programs. An interdisciplinary approach relies on contributions of immunology, orthopedics, diagnostic radiology, physiotherapy, and occupational therapy. The combined faculty and facilities of Rush Medical Center and John H. Stroger Jr. Hospital of Cook County are utilized.

4.00, Clinical

MED-861 Medical Oncology

Patients seen by the Section of Medical Oncology provide an ample and varied spectrum of oncological problems. Students study selected patients under the direction of members of the section. Various therapeutic approaches and complications occurring in the course of the disease are discussed. The program stresses the importance of the combined interdisciplinary approach using the resources of the Departments of Surgery and Therapeutic Radiology, as well as those of Pathology and Nuclear Medicine.

4.00, Clinical

MED-872 Pulmonary Consultation Services

This rotation consists of inpatient pulmonary consults and outpatient pulmonary clinics. Students will see patients on their own and present/discuss them with the team. They see a variety of new and follow-up patients. Stroger Hospital is renowned for the ethnic and clinical diversity of its patient population. Students also attend pulmonary rounds and conferences. The rotation consists of inpatient pulmonary consults and outpatient pulmonary clinics. Typical hours are 7:30 a.m. to 5:00 p.m. Students will have weekends off. Specific Educational Objectives of Clerkship: At the end of the rotation, students will

1. display an approach to history taking, physical examination and interpretation of radiographic and physiologic studies to allow accurate description of acute and chronic respiratory syndromes.
2. be able to classify respiratory illnesses based on tempo and findings as acute, sub-acute or chronic and categorize the illness as congenital or acquired, infectious, inflammatory, neoplastic or traumatic in nature.
3. demonstrate an organized approach to interpretation of chest imaging
4. demonstrate an organized approach to interpretation of cardiorespiratory physiology
5. demonstrate proficiency in physical examination of the patient with lung disease.

Role of Student in Clerkship (Patient Care, Conference): The student functions at the same level as an intern. He/she will see new patients, make assessments and plans in conjunction with the attending physicians, and continue to follow to discharge those patients worked up. Is there any

subgroup of students for whom this clerkship is especially appropriate/ recommended? Students planning a career in primary care, emergency medicine or any branch of internal medicine.
4.00, Clinical

MED-EXM Medicine Exam Remediation

Remediation of the core medicine exam only.
4.00, Clinical

MED-REM Medicine Clinical Remediation

Remediation of core medicine clinical weeks only - not required to repeat the exam.
4.00, Clinical

MIC-501 Microbiology Concepts

An introduction to the morphological and physiological characteristics of infectious agents of importance in human disease.
1.00, Class & Lab | Web Component

MIC-501 Microbiology Concepts I

An introduction to the morphological and physiological characteristics of infectious agents of importance in human disease.
2.00, Classroom

MIC-502 Microbiology Concepts II

Continuation of MIC-501.
1.00, Classroom | Web Component

MLS-300 Laboratory Fundamentals

Comprehensive instruction in laboratory mathematics, laboratory techniques and safety. Medical terminology included as an online component. Prerequisite: Departmental permission.
2.00, Classroom | Web Component

MLS-301 Clinical Chemistry I

Biochemistry, analysis and application of clinically significant chemical substances. Theory, maintenance and operation of basic equipment such as pipeting devices, balances, centrifuges, spectrophotometers and electrophoretic cells. Introduction to quality control and correlation of data for selected disease states. Covers proteins, carbohydrates and enzymes. Course includes a laboratory component. Prerequisite: Departmental permission.
4.00, Classroom | Laboratory | Web Component

MLS-302 Clinical Chemistry II

Biochemistry, analysis and application of clinically significant chemical substances. Second in a series of three courses. Theory of ion selective electrodes, osmometry, co-oximetry, and automated immunoassay analysis. Covers lipids, cardiac markers, hemoglobin degradation products, electrolytes, pH and blood

gases. Includes correlation of data for selected disease states.
3.00, Classroom | Web Component

MLS-303 Clinical Chemistry III

Biochemistry, analysis and application of clinically significant chemical substances. Third in a series of three courses. Theory of chromatography, trace/heavy metal analysis and identification of toxins. Covers pharmacokinetics, therapeutic drug monitoring, endocrinology, toxicology, fetal/maternal testing and current trends. Includes correlation of data for selected disease states.
3.00, Classroom | Web Component

MLS-310 Hematology I

This course is designed to introduce basic hematologic concepts and clinical applications. These concepts and applications will be applied to the discussion of erythrocytes and leukocytes. Erythrocyte topics include: Venipuncture, complete blood counts (CBCs), hemopoietic theory, erythrocyte metabolism and hemoglobin synthesis, introduction to erythrocyte dyscrasias including anemias of various disease etiologies, hemoglobinopathies, and thalassemias. Leukocyte topics include: Leukopoiesis, FAB classifications of leukemias, leukocyte dyscrasias of various etiologies, and lymphomas of various origins. Laboratory sessions included.
5.00, Classroom | Laboratory | Web Component

MLS-311 Hematology II

This course is designed to introduce basic concepts in coagulation and hemostasis. Topics include: megakaryopoiesis, hemostasis and coagulation, description and definitions of various coagulopathies of known and unknown etiologies.
3.00, Classroom | Web Component

MLS-312 Body Fluid Analysis

Analysis of various body fluids with emphasis on the theory and practice of clinical procedures. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates and exudates. Laboratory component included.
5.00, Class & Lab | Web Component

MLS-317 Advanced Hematology

This course consists of a review of hematologic concepts followed by a comprehensive evaluation and additional advanced theory in clinical hematology including hematopoiesis, development, metabolism, kinetics, and function of red cells, white cells, and platelets and associated hematologic disorders. P/N grading.
2.00-3.00, Online Only

MLS-320 Clinical Immunohematology

Blood group antigens and antibodies from the discoveries of Landsteiner in 1900 to the present day are studied. Blood banking procedures involved in drawing, testing, storing, and transfusing whole blood and its components are discussed. The laboratory section will deal with the basic blood bank procedures including ABO grouping, RH typing, compatibility testing and special antibody studies.

5.00, Classroom | Laboratory | Web Component

MLS-321 Clinical Immunology

An introduction to the basic concepts and terminology of immunity including development, structure and function of the lymphoid systems; the basis of antigenicity; antibody structure; methods of detection and measurement; mechanism of cellular immunity; white cell function; hypersensitivity reactions; the complement system; and mechanisms of immune suppression and tolerance. Prerequisite: Departmental permission.

3.00, Classroom | Laboratory | Web Component

MLS-330 Microbiology

Course focuses on the diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Laboratory activities familiarize the student with the colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays. These activities are then applied to the identification of unknown bacterial isolates found in patient specimens.

5.00, Class & Lab | Web Component

MLS-331 Parasitology Mycology & Virology

This course provides clinical background in mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. The laboratory portion consists of identification, specimen collection and processing of medically important viruses, fungi and parasites.

4.00, Class & Lab | Web Component

MLS-344 Professional Development I

Course introduces the student to the profession of clinical laboratory science. The various professional, accrediting and certifying organizations are discussed. Students learn about the profession from experienced clinical laboratory scientists. The past, present and future of the profession are discussed including present and future trends in education and employment.

4.00, Classroom | Web Component

MLS-345 Professional Development II

Course focus is on professional issues, professional conduct and ethics. Students discuss various trends and factors that affect the profession. An in-depth series of ethical issues and behavior are presented and analyzed. Scientific integrity and responsible conduct are discussed.

2.00, Classroom | Online (75% or Greater)

MLS-413 Hematology Case Studies

Review of erythrocyte, leukocyte, and coagulation disorders through the use of case studies. Critical thinking is used to analyze patient histories, clinical symptoms, and significant laboratory findings.

2.00, Online Only

MLS-422 Clinical Immunology II

A continuation of MLS-321. Topics include the immune response and the laboratory testing related to measuring the immune response. The pathogenesis and laboratory diagnosis of immunological disorders such as hypersensitivities, immune deficiencies, and autoimmunity. Developing and solving case studies involving immune disorders will be an important aspect of learning about these diseases.

2.00, Classroom | Web Component

MLS-432 Infectious Disease Case Studies

This course will provide the student with the opportunity to analyze patient laboratory information in order to diagnose the infectious disease. The student will analyze prepared case studies and answer questions regarding the case and the causative agent in the form of homework assignments, class discussions and by composing their own case study with information from the literature, textbooks, and the Internet.

2.00, Online Only

MLS-433 Molecular Techniques

The molecular biology course consists of an introduction to the principles, methodologies and applications of molecular biological procedures used in the clinical laboratories. Emphasis is placed on the molecular biological procedures used in the identification of infectious agents that cause human disease and in the detection of mutations resulting in neoplasm or congenital disorders. Laboratory component included. Prerequisite: Departmental permission.

4.00, Classroom | Laboratory | Web Component

MLS-440 Medical Laboratory Science Seminar

This course is designed as a research seminar during which students and faculty present clinical laboratory science research topics for discussion. Various research designs, sampling

techniques and data analysis methods are discussed.

2.00, Classroom | Web Component

MLS-450 Lab Info & Automation Systems

Presents an overview of total laboratory automation systems (TLA) and clinical laboratory information systems (LIS) including system functionality, selection, installation, validation, maintenance, security and interfaces. Topics include the electronic health record (EHR) and clinical information systems that interface with the LIS. The purpose of selected hardware, the operating system and specialized software will be reviewed.

Prerequisite: Departmental permission.

2.00, Classroom | Web Component

MLS-451 Quality Issues in Clinical Laboratory Science

This course presents methods and strategies to ensure quality testing in all types of laboratory settings including point of care testing (POCT) and physicians' office laboratories (POLs). Topics include quality assurance, proficiency testing, method evaluation, establishing reference values and predictive value statistics. Common POCT devices will be described and students will learn how laboratory professionals ensure the competency of individuals performing POCT. The regulatory bodies involved in these processes will be introduced.

3.00, Classroom | Web Component

MLS-452 Regulatory Issues

Covers the history and impact of government and private controls on the quality and accessibility of laboratory services. Topics include: OSHA, HIPAA, test reimbursement, direct access testing, professional certification, licensure, unionization, and educational program accreditation. Students will examine proposed state and federal legislation and learn ways to influence passage of good laboratory-related law. The professional/public image of the CLS profession will also be discussed.

2.00, Classroom | Web Component

MLS-453 Communications

Interpersonal and organizational communication techniques for creating effective communication with subordinates, peers and managers. Consultation and project management techniques will be included.

2.00, Classroom | Web Component

MLS-456 Clinical Laboratory Management

Management of the clinical laboratory will be covered in this course with topics to include: operational aspects of the laboratory, human resource management, financial considerations of running a laboratory, error management, personality and leadership styles, and crisis and disaster management. Students

will participate in interactive sessions designed to help them understand and develop important leadership and management concepts.

3.00, Classroom | Web Component

MLS-467 Comprehensive Review

A comprehensive review of Hematology, Body Fluids, Clinical Chemistry, Laboratory Mathematics, Immunology, Immunohematology, Molecular Diagnostics, and Microbiology. This review course prepares students for the national certification examinations. At the completion of the review all student take a comprehensive examination. Successful passing of all sections of the comprehensive examination is required for completion of the course and for graduation. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

MLS-470P Clinical Practicum-Chemistry

The practicum builds upon the theoretical knowledge and techniques learned during year one in the MLS clinical chemistry laboratory and lecture courses. The rotation is designed to introduce students to the working environment of a clinical chemistry laboratory and provide opportunities for students to work with state of the art chemistry instrumentation and techniques.

4.00, Classroom | Practicum | Web Component

MLS-471P Clinical Practicum-Hematology

Course includes application of basic skills learned in Hematology course work. This is a clinical rotation through the hospital hematology laboratory. Basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies, special hematologic testing techniques, bone marrow techniques, and coagulation are included.

4.00, Classroom | Practicum | Web Component

MLS-472P Clinical Practicum-Microbiology I

Rotation through the clinical bacteriology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Classroom | Practicum | Web Component

MLS-473P Clinical Practicum-Microbiology II

Rotation through the specialty laboratory laboratories of clinical microbiology including parasitology, anaerobes, mycobacteriology, mycology and virology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Practicum | Web Component

MLS-473P Clinical Practicum-Microbiology II

Rotation through the specialty laboratory laboratories of clinical microbiology including parasitology, anaerobes, mycobacteriology, mycology and virology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.
2.00, Classroom | Practicum | Web Component

MLS-474P Clinical Practicum-Immunohematology

Rotation through the hospital blood bank laboratory. Applications of basic skills learned in student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.
4.00, Classroom | Practicum | Web Component

MLS-475P Clinical Practicum Immunology/Molecular Diagnostics

Rotation through clinical immunology and molecular diagnostic laboratories. Applications of basic skills learned in the student laboratory are practiced. Areas included are serology, histocompatibility typing, flow cytometry, karyotyping, molecular oncology, nucleic acid amplification, DNA sequencing, FISH probe analysis and other diagnostic procedures.
4.00, Practicum | Web Component

MLS-475P Clinical Practicum Immunology/Molecular Diagnostics

Rotation through clinical immunology and molecular diagnostic laboratories. Applications of basic skills learned in the student laboratory are practiced. Areas included are serology, histocompatibility typing, flow cytometry, karyotyping, molecular oncology, nucleic acid amplification, DNA sequencing, FISH probe analysis and other diagnostic procedures.
2.00, Classroom | Practicum | Web Component

MLS-476P Clinical Practicum-Education

Students will assist in the instruction of the student laboratory sessions. They will work with the course director in the preparation and execution of laboratory experiments by first year students. Educational principles and curriculum planning skills will be learned through online discussions and exercises. P/N grading.
4.00, Classroom | Practicum | Web Component

MLS-477P Clinical Specialty Practicum

The Specialty Practicum provides students with an opportunity to select a specific laboratory of interest to them. Students spend four weeks developing advanced techniques and exploring the latest technology available in the clinical laboratory. Areas may include bone marrow cell analysis, advanced

genetics, advanced hematology, retrovirology and laboratory safety.

4.00, Classroom | Practicum | Web Component

MLS-478P Patient Care Techniques

Techniques of specimen collection and phlebotomy are discussed and practiced. Students will perform a minimum of 50 venipuncture procedures on in-house patients throughout the various areas of the hospital and in the outpatient clinics. Pediatric and geriatric patients are included, as are general adult population patients. Procedures for specimen processing and ordering are learned. Procedures for specimen collection and handling with an emphasis pre-analytical situations, documentation, transportation requirements and infection control are covered in this course. Students will also learn about basic phlebotomy equipment and techniques involved in specimen collection, including venipuncture and capillary collection procedures on adult and children populations.
2.00, Practicum | Web Component

MLS-500 Laboratory Fundamentals

Comprehensive instruction in laboratory mathematics, laboratory techniques and safety. Medical terminology included as an online component. Prerequisite: Departmental permission.
2.00, Classroom | Web Component

MLS-501 Clinical Chemistry I

Biochemistry, analysis and application of clinically significant chemical substances. Theory, maintenance and operation of basic equipment such as pipeting devices, balances, centrifuges, spectrophotometers and electrophoretic cells. Introduction to quality control and correlation of data for selected disease states. Covers proteins, carbohydrates and enzymes. Course includes a laboratory component. Prerequisite: Departmental permission.
4.00, Classroom | Laboratory | Web Component

MLS-502 Clinical Chemistry II

Biochemistry, analysis and application of clinically significant chemical substances. Second in a series of three courses. Theory of ion selective electrodes, osmometry, co-oximetry, and automated immunoassay analysis. Covers lipids, cardiac markers, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states.
3.00, Classroom | Web Component

MLS-503 Clinical Chemistry III

Biochemistry, analysis and application of clinically significant chemical substances. Third in a series of three courses. Theory of chromatography, trace/heavy metal analysis and identification of

toxins. Covers pharmacokinetics, therapeutic drug monitoring, endocrinology, toxicology, fetal/maternal testing and current trends. Includes correlation of data for selected disease states.
3.00, Classroom | Web Component

MLS-510 Hematology I

This course is designed to introduce basic hematologic concepts and clinical applications. These concepts and applications will be applied to the discussion of erythrocytes and leukocytes. Erythrocyte topics include: Venipuncture, complete blood counts (CBCs), hemopoietic theory, erythrocyte metabolism and hemoglobin synthesis, introduction to erythrocyte dyscrasias including anemias of various disease etiologies, hemoglobinopathies, and thalassemias. Leukocyte topics include: Leukopoiesis, FAB classifications of leukemias, leukocyte dyscrasias of various etiologies, and lymphomas of various origins. Laboratory sessions included.
5.00, Classroom | Laboratory | Web Component

MLS-511 Hematology II

This course is designed to introduce basic concepts in coagulation and hemostasis. Topics include: megakaryopoiesis, hemostasis and coagulation, description and definitions of various coagulopathies of known and unknown etiologies.
3.00, Classroom | Web Component

MLS-512 Body Fluid Analysis

Analysis of various body fluids with emphasis on the theory and practice of clinical procedures. Component topics will include the analyses of urine, cerebral spinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, feces, semen, and the differentiation of transudates and exudates. Laboratory component included.
5.00, Class & Lab | Web Component

MLS-513 Hematology Case Studies

Review of erythrocyte, leukocyte, and coagulation disorders through the use of case studies. Critical thinking is used to analyze patient histories, clinical symptoms, and significant laboratory findings.
2.00, Online Only

MLS-517 Advanced Hematology

This course consists of a review of hematologic concepts followed by a comprehensive evaluation and additional advanced theory in clinical hematology including hematopoiesis, development, metabolism, kinetics, and function of red cells, white cells, and platelets and associated hematologic disorders. P/N grading.
2.00-3.00, Online Only

MLS-520 Clinical Immunoematology

Blood group antigens and antibodies from the discoveries of Landsteiner in 1900 to the present day are studied. Blood banking procedures involved in drawing, testing, storing, and transfusing whole blood and its components are discussed. The laboratory section will deal with the basic blood bank procedures including ABO grouping, RH typing, compatibility testing and special antibody studies.
5.00, Classroom | Laboratory | Web Component

MLS-521 Clinical Immunology

An introduction to the basic concepts and terminology of immunity including development, structure and function of the lymphoid systems; the basis of antigenicity; antibody structure; methods of detection and measurement; mechanism of cellular immunity; white cell function; hypersensitivity reactions; the complement system; and mechanisms of immune suppression and tolerance. Prerequisite: Departmental permission.
3.00, Classroom | Laboratory | Web Component

MLS-522 Clinical Immunology II

A continuation of MLS 321/521. Topics include the immune response and the laboratory testing related to measuring the immune response. The pathogenesis and laboratory diagnosis of immunological disorders such as hypersensitivities, immune deficiencies, and autoimmunity. Developing and solving case studies involving immune disorders will be an important aspect of learning about these diseases.
2.00, Classroom | Web Component

MLS-530 Microbiology

Course focuses on the diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed. Laboratory activities familiarize the student with the colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacteria isolates, including the gram stain and various biochemical assays. These activities are then applied to the identification of unknown bacterial isolates found in patient specimens.
5.00, Class & Lab | Web Component

MLS-531 Parasitology, Mycology & Virology

This course provides clinical background in mycology, parasitology, and virology. Emphasis is on the disease involved and on diagnostic procedures used in the laboratory. The laboratory portion consists of identification, specimen collection and processing of medically important viruses, fungi and parasites.
4.00, Classroom | Laboratory | Web Component

MLS-532 Infectious Disease Case Studies

This course will provide the student with the opportunity to analyze patient laboratory information in order to diagnose the infectious disease. The student will analyze prepared case studies and answer questions regarding the case and the causative agent in the form of homework assignments, class discussions and by composing their own case study with information from the literature, textbooks, and the Internet.

2.00, Online Only

MLS-533 Molecular Techniques

The molecular biology course consists of an introduction to the principles, methodologies and applications of molecular biological procedures used in the clinical laboratories. Emphasis is placed on the molecular biological procedures used in the identification of infectious agents that cause human disease and in the detection of mutations resulting in neoplasm or congenital disorders. Laboratory component included. Prerequisite: Departmental permission.

4.00, Classroom | Laboratory | Web Component

MLS-540 Medical Laboratory Science Seminar

This course is designed as a research seminar during which students and faculty present clinical laboratory science research topics for discussion. Various research designs, sampling techniques and data analysis methods are discussed.

2.00, Classroom | Web Component

MLS-544 Professional Development I

Course introduces the student to the profession of clinical laboratory science. The various professional, accrediting and certifying organizations are discussed. Students learn about the profession from experienced clinical laboratory scientists. The past, present and future of the profession are discussed including present and future trends in education and employment.

4.00, Classroom | Web Component

MLS-545 Professional Development II

Course focus is on professional issues, professional conduct and ethics. Students discuss various trends and factors that affect the profession. An in-depth series of ethical issues and behavior are presented and analyzed. Scientific integrity and responsible conduct are discussed.

2.00, Classroom | Online (75% or Greater)

MLS-550 Lab Information & Automation Systems

Presents an overview of total laboratory automation systems (TLA) and clinical laboratory information systems (LIS) including system functionality, selection, installation, validation, maintenance, security and interfaces. Topics include the electronic

health record (EHR) and clinical information systems that interface with the LIS. The purpose of selected hardware, the operating system and specialized software will be reviewed.

Prerequisite: Departmental permission.

2.00, Classroom | Web Component

MLS-551 Quality Issues in Clinical Laboratory Science

This course presents methods and strategies to ensure quality testing in all types of laboratory settings including point of care testing (POCT) and physicians' office laboratories (POLs). Topics include quality assurance, proficiency testing, method evaluation, establishing reference values and predictive value statistics. Common POCT devices will be described and students will learn how laboratory professionals ensure the competency of individuals performing POCT. The regulatory bodies involved in these processes will be introduced.

3.00, Classroom | Web Component

MLS-552 Regulatory Issues

Covers the history and impact of government and private controls on the quality and accessibility of laboratory services. Topics include: OSHA, HIPAA, test reimbursement, direct access testing, professional certification, licensure, unionization, and educational program accreditation. Students will examine proposed state and federal legislation and learn ways to influence passage of good laboratory-related law. The professional/public image of the CLS profession will also be discussed.

2.00, Classroom | Web Component

MLS-553 Communications

Interpersonal and organizational communication techniques for creating effective communication with subordinates, peers and managers. Consultation and project management techniques will be included.

2.00, Classroom | Web Component

MLS-556 Clinical Laboratory Management

Management of the clinical laboratory will be covered in this course with topics to include: operational aspects of the laboratory, human resource management, financial considerations of running a laboratory, error management, personality and leadership styles, and crisis and disaster management. Students will participate in interactive sessions designed to help them understand and develop important leadership and management concepts.

3.00, Classroom | Web Component

MLS-563 Master's Project I

First part in planning and conducting the required master's degree research project. Students are expected to begin

formulation of their research questions and to complete their review of the literature. Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results.

P/N grading.

2.00, Classroom

MLS-564 Master's Project II

Continuation of MLS-563 At the completion of this course the student should be ready to present their research proposal to their committee for the preliminary defense and to begin and complete the data collection phase of their research. Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results. Prerequisite: P/N grading.

2.00, Classroom

MLS-565 Master's Project III

Continuation of MLS-564. During this phase, the research report is completed and the final defense of the project takes place.

Student projects are designed in various areas of the clinical laboratories and focus on clinical testing, management and supervision issues. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results. Prerequisite: Departmental permission. P/N grading.

2.00, Classroom

MLS-567 Comprehensive Review

A comprehensive review of Hematology, Body Fluids, Clinical Chemistry, Laboratory Mathematics, Immunology, Immunohematology, Molecular Diagnostics, and Microbiology. This review course prepares students for the national certification examinations. At the completion of the review all student take a comprehensive examination. Successful passing of all sections of the comprehensive examination is required for completion of the course and for graduation. Prerequisite: Departmental permission.

2.00, Classroom | Web Component

MLS-570P Clinical Practicum-Chemistry

The practicum builds upon the theoretical knowledge and techniques learned during year one in the MLS clinical chemistry laboratory and lecture courses. The rotation is designed to introduce students to the working environment of a clinical chemistry laboratory and provide opportunities for students to work with

state of the art chemistry instrumentation and techniques.

4.00, Classroom | Practicum | Web Component

MLS-571P Clinical Practicum-Hematology

Course includes application of basic skills learned in Hematology course work. This is a clinical rotation through the hospital hematology laboratory. Basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies, special hematologic testing techniques, bone marrow techniques, and coagulation are included.

4.00, Classroom | Practicum | Web Component

MLS-572P Clinical Practicum-Microbiology I

Rotation through the clinical bacteriology laboratories.

Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Classroom | Practicum | Web Component

MLS-573P Clinical Practicum-Microbiology II

Rotation through the specialty laboratory laboratories of clinical microbiology including parasitology, anaerobes, mycobacteriology, mycology and virology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Practicum | Web Component

MLS-573P Clinical Practicum-Microbiology II

Rotation through the specialty laboratory laboratories of clinical microbiology including parasitology, anaerobes, mycobacteriology, mycology and virology laboratories. Applications of basic skills learned in the student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

2.00, Classroom | Practicum | Web Component

MLS-574P Clinical Practicum-Immunohematology

Rotation through the hospital blood bank laboratory. Applications of basic skills learned in student laboratory are practiced. Instrumentation and advanced methodologies are emphasized.

4.00, Classroom | Practicum | Web Component

MLS-575P Clinical Practice Immunology/Molecular Diagnostics

Rotation through clinical immunology and molecular diagnostic laboratories. Applications of basic skills learned in the student laboratory are practiced. Areas included are serology, histocompatibility typing, flow cytometry, karyotyping, molecular oncology, nucleic acid amplification, DNA sequencing, FISH probe analysis and other diagnostic procedures.

4.00, Practicum | Web Component

MLS-575P Clinical Practice Immunology/Molecular Diagnostics

Rotation through clinical immunology and molecular diagnostic laboratories. Applications of basic skills learned in the student laboratory are practiced. Areas included are serology, histocompatibility typing, flow cytometry, karyotyping, molecular oncology, nucleic acid amplification, DNA sequencing, FISH probe analysis and other diagnostic procedures.

2.00, Classroom | Practicum | Web Component

MLS-576P Clinical Practicum-Education

Students will assist in the instruction of the student laboratory sessions. They will work with the course director in the preparation and execution of laboratory experiments by first year students. Educational principles and curriculum planning skills will be learned through online discussions and exercises. P/N grading.

4.00, Classroom | Practicum | Web Component

MLS-578P Patient Care Techniques

Techniques of specimen collection and phlebotomy are discussed and practiced. Students will perform a minimum of 50 venipuncture procedures on in-house patients throughout the various areas of the hospital and in the outpatient clinics. Pediatric and geriatric patients are included, as are general adult population patients. Procedures for specimen processing and ordering are learned. Procedures for specimen collection and handling with an emphasis pre-analytical situations, documentation, transportation requirements and infection control are covered in this course. Students will also learn about basic phlebotomy equipment and techniques involved in specimen collection, including venipuncture and capillary collection procedures on adult and children populations.

2.00, Practicum | Web Component

MLS-585 Selected Topics & Comprehensive Review

Advanced study of current trends; assigned topics in current literature read, evaluated and discussed. Topics include, but are not limited to, basics of research and education, information systems in blood bank, parentage testing, medical-legal, and ethical aspects of blood banking, and laboratory math for the blood banker. A comprehensive review and exam is provided for students completing the SBB program and eligible to sit for the ASCP SBB certification examination. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor.

3.00, Online Only

MLS-587 Specialist in Blood Bank Project

Independent investigation of a topic relevant to an area in immunohematology. Student submits a written research paper as

well as prepares and delivers a presentation based on the topic selected. Students enrolled in the SBB Traditional curriculum must participate in a research project and develop a presentation for a professional audience. Students must take a minimum of 3 QH within 4 quarters. It is recommended that the student take no more than 3 QH within any given quarter. P/N grading. 1.00, Online Only

MLS-597 Issues & Practices HR Management

This course will include an overview of the operational and strategic role that Human Resource Management plays in Health Care institutions. Readings, case studies, internet references, and website resources will permit the learner to acquire advanced and current information in human resource management, recruitment and hiring, training and development, compensation and benefits, labor relations (both union and non-union), and health and safety.

4.00, Online Only

MLS-598 Health Care Informatics

This course will include an overview of healthcare informatics. It is designed to provide a web-based learning approach to teaching the principles of laboratory information systems management, and the review processes for selection, installation, building test dictionaries, validation, training and integration with electronic health records. Readings, articles from professional journals, internet references and website resources will permit the learner to acquire advanced and current information in each of the major topic area.

4.00, Online Only

MPH-500 Introduction to Medical Physics

An introductory course in physics for residents in diagnostic radiology, nuclear medicine and radiation oncology. The course covers medical x-ray equipment design and use, clinical dosimetry, and quality assurance

1.00, Classroom

MPH-521 Therapeutic Radiology Physics

An introductory course in clinical medical physics for therapeutic radiology trainees, including residents, students, and fellows. Structure of matter, radioactive decay, production of radiation, treatment machines, and radiation interactions are studied.

2.00, Classroom

MPH-521 Therapeutic Radiology Physics

An introductory course in clinical medical physics for therapeutic radiology trainees, including residents, students, and fellows. Structure of matter, radioactive decay, production of radiation, treatment machines, and radiation interactions are studied.

2.00, Classroom

MPH-522 Dosimetry Applied Therapeutic Radiology

Intermediate course in clinical medical physics for therapeutic radiology trainees, including residents, fellows, students, dosimetrists and technologists. Measurement of exposure and dose, calibration of high energy photon and electron beams, and dose distributions for external-beam therapy are studied.

2.00, Classroom

MPH-523 Brachiotherapy Physics Radiation Protection QA

This course is designed for residents in therapeutic radiology, students and fellows. Topics include basic physics of radioactivity, and use of radioactive isotopes in clinical radiotherapy, principles of radiation protection, quality assurance, and error reduction in radiation oncology.

2.00, Classroom

MPH-524 Special Topics: Radiation Oncology Physics

Course covers advanced topics in radiation oncology physics including: dose calculation algorithms, medical imaging applied to radiation oncology, errors and uncertainties, 3D-CRT, IMRT/IGRT, radiosurgery, biological models (NTCP-TCP), and outcome studies. This course is offered every fourth year. Different topics will be covered each quarter. The students must register each quarter during the year the course is offered. Prerequisite: MPH-522

1.00-12.00, Classroom

MPH-525 Radiotherapy Physics Review

Review of medical physics concepts for therapeutic radiology residents, dosimetry trainees, and students and fellows in medical physics.

2.00, Classroom

MPH-526 Fundamentals Radiation Biology

This course describes the effects of ionizing radiation on both individual cells and on the human being as a whole. Factors that modulate these effects, such as oxygen, dose rate, and various chemicals, will be explored. This course is suitable for residents in radiation oncology, nuclear medicine, and diagnostic radiology, as well as graduate students with an interest in radiation effects.

1.00-5.00, Classroom

MPH-527 Radiation Oncology

Basic concepts and principles of nonsurgical cancer management. The natural history of cancers in various organs will be reviewed and therapeutic strategies developed based on the pathophysiology of different cancer sites.

2.00, Classroom

MPH-570PA Clinical Physics Practicum: Diagnostic Imaging

Students participate in providing clinical physics service under supervision.

1.00-12.00, Practicum

MPH-570PB Clinical Physics Practicum: Radiation Therapy

Students participate in providing clinical physics service under supervision.

1.00-12.00, Practicum

MPH-570PC Clinical Physics Practicum: Protection

Radiation Students participate in providing clinical physics service under supervision.

1.00-12.00, Practicum

MPH-580 Master's Research

See course director for description. (variable)

1.00-12.00, Classroom

MPH-608 Topics in Medical Physics

Course covers selected topics in radiation detection, interaction, and protection. Topics will also be selected from radiation dosimetry and diagnostic and therapeutic imaging.

1.00-12.00, Classroom

MPH-621 Medical Physics Research Seminar

This seminar serves as a forum for review of the ongoing research by the faculty, residents, appropriate staff members, fellows, and students.

1.00, Classroom

MPH-622 Radiological Physics Laboratory

A practical course directed towards understanding of the instruments, computers, apparatus, and facilities used in applied radiation work. Includes carrying out scientific evaluation and essay-type reporting.

1.00-12.00, Laboratory

MPH-623PA Clinical Physics Practicum: Diagnostic Imaging

Students participate in providing clinical physics service under supervision.

1.00-12.00, Practicum

MPH-623PB Clinical Physics Practicum: Radiation Therapy

Students participate in providing clinical physics service under supervision.

1.00-12.00, Practicum

MPH-623PC Clinical Physics Practicum: Protection

RadiationStudents participate in providing clinical physics
1.00-12.00, Practicum

MPH-900 Independent Study

The student will undertake a creative project design under the supervision of a faculty member.

1.00-12.00, Independent Study

MPH-900 Independent Study

The student will undertake a creative project design under the supervision of a faculty member.

1.00-9.00, Independent Study

NEU-501 Medical Neurobiology

An integrated approach to the central and peripheral nervous system is presented from an anatomic, physiologic and neurochemical standpoint. Based on neuroanatomy, major systems are developed and discussed in terms of anatomic arrangement, physiologic functioning and related synaptic pharmacology. In all systems clinical lectures highlight the practical applications of basic science concepts in patient evaluation and management.

1.00, Class & Lab | Web Component

NEU-502 Medical Neurobiology-Graduate Students

An integrated approach to the central and peripheral nervous system is presented from an anatomic, physiologic and neurochemical standpoint. Based on neuroanatomy, major systems are developed and discussed in terms of anatomic arrangement, physiologic functioning and related synaptic pharmacology. In all systems clinical lectures highlight the practical applications of basic science concepts in patient evaluation and management.

6.00, Class & Lab | Web Component

NEU-511 Techniques in Neuroscience

Graduate students rotate through various faculty members' laboratories and master techniques commonly in use in neuroscience laboratories.

2.00, Laboratory

NEU-544 Statistics and Experimental Design for Neuroscience

This course covers multi-way ANOVA, repeated measures ANOVA, mixed models, multiple regression, and special statistical topics selected as relevant to research in neuroscience. This one quarter course is required of doctoral candidates in the Division of Neuroscience, and is open to a small number of other doctoral candidates in The Graduate College. Master's candidates in The Graduate College may be admitted with the permission of the course director if space is available.

2.00, Classroom

NEU-591 Advanced Neuroscience Proseminar

Taught jointly by participating faculty, seminar format is used to encourage extensive discussion and participation.

6.00, Classroom

NEU-598 Pre-Dissertation Research

Research credits prior to acceptance to doctoral candidacy.

2.00-12.00, Laboratory

NEU-598 Pre-Doctoral Research

Research credits prior to acceptance to doctoral candidacy.

1.00-9.00, Laboratory

NEU-690 Selected Topics in Neuroscience

Study of contemporary topics in neuroscience.

1.00-4.00, Classroom

NEU-690 Selected Topics in Neuroscience

Study of contemporary topics in neuroscience.

3.00, Classroom

NEU-699 Dissertation Research

Research credits after admission to candidacy.

1.00-12.00, Laboratory

NEU-699 Doctoral Research

Research credits after admission to candidacy.

1.00-9.00, Laboratory

NEU-701 Core Clerkship: Neurology

The clerkship in Neurology is designed to introduce students to the care of patients with neurological illness. Through an exposure to patients with a variety of illnesses, the students will develop their neurological examination and history-taking skills, as well as an understanding of the work-up, diagnosis, and management of patients with neurological symptoms and diseases. At both Rush and Stroger Hospitals, the student has extensive interaction with both attending staff and residents, and participates in daily attending rounds. Didactic teaching during the rotation includes a formal lecture series on topics in clinical neurology. In addition, there are weekly departmental conferences including Neurology Grand Rounds. Students participate in the diagnostic workup of assigned patients. At Rush, the student is a member of the general neurology floor service and the stroke/critical care service for two weeks each. At Stroger Hospital, students are members of the neurology team that sees neurology in-patients and consultation patients, as well as attending two outpatient clinics per week. All students are expected to be in attendance and prepared for daily work rounds and daily attending rounds. They are responsible for performing a history and physical examination on their assigned

patients and presenting their patients. Students are expected to be involved closely in the initial and daily follow-up care of their patients, including writing daily notes. In addition, students are expected to attend all assigned lectures and conferences. There is rotating call for medical students. Students are required to participate in clinical activities the Thursday morning before the mini-board examination.

4.00, Clinical | Web Component

NEU-781 Research in Neurology

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00-8.00, Clinical

NEU-792 Advanced Neurology

Students are expected to be present Monday-Friday. Dr. Soni should be notified as soon as possible of any illnesses or medical emergencies that arise. These will be addressed on an individual basis.

4.00, Clinical

NEU-792X Advanced Neurology-Away

This advanced clerkship provides students the opportunity to further develop their clinical skills. Students will participate in the outpatient activities of the department and, in particular, will have ample opportunities to see patients in the movement disorder, epilepsy, muscular dystrophy, and multiple sclerosis clinics. This is a flexible program which will be structured to fit the interest and needs of individual students. Prerequisite: NEU 701.

4.00, Clinical

NEU-7EI Neurology Elective

Students may receive credit for an individually arranged elective with a Rush faculty members. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation.

The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Education before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements. Elective
4.00, Clinical

NEU-900 Independent Study

Specialized course work designed around the needs of an individual student.

1.00-12.00, Independent Study

NEU-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
Continuous Enrollment

NEU-EXM Neurology Exam Remediation

Remediation of Core Neurology exam only.

4.00, Clinical

NEU-REM Neurology Clinical Remediation

Remediation of clinical weeks only - not required to repeat the exam.

4.00, Clinical

NFA-501 Registered Nurse First Assist

This is the didactic course for the Registered Nurse First Assistant (RNFA) series that prepares advanced practice nurses to assume the expanded role of a certified first assistant in the operating room. The course focuses on anatomic and physiologic considerations related to specific surgical interventions, psychomotor skill acquisition, application of the nursing process for the perioperative patient, and the role of the RNFA. Prereq: Admittance to the Registered Nurse First Assistant series.

3.00, Online Only

NFA-502P Registered Nurse First Assist Practicum

This is the practicum course for the Registered Nurse First Assistant (RNFA) series. It provides an orientation to the operating room environment and allows the student to: a) articulate the role of the RNFA throughout the continuum of care for the surgical patient; b) develop cognitive, psychomotor, and affective behaviors that demonstrate accountability and responsibility for identifying and meeting the needs of the perioperative patient; c) utilize the nursing process as a foundation for practice; d) collaborate with the surgeon and other health care team members to achieve optimal patient outcomes and; d) practice safely in the operating room environment. Students are required to practice a minimum of 120 hours of intraoperative first assisting hours under the supervision of a licensed surgeon preceptor. 3.00, Practicum | Online Only

NFA-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work. 1.00, Continuous Enrollment

NGT-510 Applied Statistics Module

This course develops students' ability to apply statistical concepts to guide evidence-based practice in a dynamic health care environment at the micro and mezzo level. 1.00, Online Only

NGT-530F Pharmacotherapeutics Anesthesia I

This course focuses on the pharmacokinetics and pharmacodynamics of intravenous, inhaled and local anesthetic agents and drugs which serve as adjuncts during the perioperative period. The interactions between anesthetic drugs and other selected drugs and drug classes will be discussed, especially as they impact the anesthetic plan of care. 3.00, Classroom | Web Component

NGT-530G Pharmacotherapeutics Anesthesia II

This course is designed to be a comprehensive study of the pharmacokinetics and pharmacodynamics involved with the administration of anesthesia. The interactions between anesthetic agents and other pharmacological substances will be discussed. The effects of the aging process and patient coexisting

disease on the pharmacokinetics and pharmacodynamics will also be studied.

3.00, Classroom | Web Component

NGT-531A Basic Principles of Anesthesia Nsg

Principles and skills basic to the practice of anesthesia nursing are discussed. Focus is on patient assessment and planning care. Anesthesia principles related to select surgical specialties and perioperative management discussed with emphasis upon understanding anatomic, physiologic/pathologic principles, and use of pharmacologic intervention. Prerequisite

5.00, Classroom | Web Component

NGT-531B Advanced Principles Anesthesia Nursing

Anesthesia principles related to surgical specialties and perioperative management will be discussed including anesthetic care of the parturient and child from neonate through adolescence. Understanding anatomic, physiologic/pathologic principles, and use of pharmacologic intervention will be emphasized. More advanced airway management and regional anesthesia and analgesia techniques will be studied.

4.00, Classroom | Web Component

NRS-500 Core Concepts/Advanced Generalist

Assists the learner to identify, understand, and apply concepts essential to the practice of client and family-centered nursing across the lifespan. A variety of teaching methodologies will be used to examine essential physiological and psychosocial concepts, the professional nursing role, and introductory clinical reasoning.

3.00, Classroom | Web Component | Laboratory

NRS-500P Core Concepts/Advanced General Practicum

Provides an opportunity for the learner to analyze and apply core concepts presented in the didactic courses. Using a variety of health care settings, the learner will establish therapeutic relationships with a variety of clients and determine selected health care needs of individuals and groups. The role of the advanced generalist in assessing, analyzing, and evaluating individuals, groups, and systems is emphasized.

2.00, Practicum | Web Component

NRS-502A Issues in APN Role Development

This course is designed to provide an overview of Advanced Practice Nursing (APN) roles in the current healthcare marketplace. The course will address the context in which APN's practice, including the organization of health care delivery systems, economics of managed care and health policy. Students will be able to describe a model of APN practice along with core competencies and identify strategies to support and promote APN practice.

2.00, Classroom | Web Component

NRS-502B Transition to APN Role

This is the second in a two part series dealing with issues relevant to APN practice. This course focuses on management, organization, regulatory and reimbursement issues necessary for entering into a first position as an APN in the current market-place. Prerequisite: NRS 502A and a minimum of 6 hours of NRS 541P.

2.00, Online Only

NRS-503 Physical Diagnosis: Assessment & Evaluation Across the Lifespan

This is a course designed to enhance the student's knowledge of physical assessment and the differential diagnosis of physical findings through both didactic and clinical methods. Students apply clinical problem-solving skills. The content is organized around the health assessment of patients across the lifespan. Pre-requisites: Basic Physical Assessment course, RN licensure and admission to the College of Nursing. Prerequisite or co-requisite: NRS 555 and NRS 551.

4.00, Classroom | Web Component

NRS-503A Neonatal Assessment/Diagnosis

The course focuses on the knowledge and skills necessary to perform comprehensive assessment of neonates and infant through the first year of life. Systematic data collection and interpretation, diagnostic reasoning, and clinical problem solving for a variety of neonates from the very low birth with pre-term to the health infant is emphasized along with developing clinical proficiency. Content will include Perinatal history taking, assessment of fetal well-being, neonatal physical examination, gestation age assessment, neurobehavioral assessment, and the use of diagnostic tests/tools such as radiographics, instrumentation, monitoring devices, etc. Prerequisite Basic physical assessment course, RN licensure and admission to the College of Nursing.

3.00, Online Only

NRS-504 Health Assessment-Advanced Generalist

Provides comprehensive health promotion and health assessment techniques through a multidimensional case study approach. Addresses comprehensive history, physical, and psychological assessment of signs and symptoms, pathophysiologic changes and psychological variations across the lifespan.

3.00, Classroom | Web Component

NRS-504P Health Assessment-Advanced Generalist Practicum

Provides practice and application of comprehensive health assessment techniques across the lifespan, including completion of a comprehensive history and physical.

2.00, Classroom | Web Component

NRS-505 Pathophysiology-Advanced Generalist

Provides a conceptual approach to alterations in normal anatomic structure and function. General and system specific concepts related to causation and clinical presentation of pathophysiology are discussed. This course will provide the foundation for the application of advanced pathophysiologic concepts to common clinical situations. Critical thinking is emphasized. Application of evidence-based pathophysiologic research will be discussed. Prerequisite: satisfactory completion of NRS 500 and NRS 500P.

4.00, Classroom | Web Component

NRS-506 Pharmacology-Advanced Generalist

Provides a conceptual lifespan approach to understanding pharmacotherapeutics. Stresses scientific principles underlying pharmacological treatments. Critical thinking is emphasized. Application of research is discussed. Reliable pharmacotherapeutic resources for the practitioner and patient are introduced. Prerequisite: satisfactory completion of NRS 500 and NRS 500P.

4.00, Classroom | Web Component

NRS-507 Advanced Generalist Ethics & Role

Provides an exploration of the ethical issues related to practice as an advanced generalist. Application of ethical principles and standards to clinical environments and clinically relevant ethical issues is emphasized. The role of the advanced generalist is analyzed and compared to other nursing roles, with an emphasis on implementation of the advanced generalist role in various health care contexts. Post-BSN students only. Students will register for section "W."

3.00, Online Only

NRS-513 Synthesis Scientific Concepts for Practitioners

Using case studies, students will synthesize and apply concepts and principles related to health assessment, pathophysiology, and pharmacology. In small groups, students will apply concepts and principles to identify nursing problems and formulate and evaluate plans of care. Prerequisite: Satisfactory completion of NRS 500 and NRS 500P; co-requisite or prerequisite: satisfactory completion of NRS 505, NRS 506, NRS 504, NRS 504P.

1.00, Classroom | Web Component

NRS-514 Psychological/Mental Health Nursing

In this course the students will synthesize multidisciplinary knowledge to assess, plan, implement, and evaluate evidence-based prevention, treatment, and self-management interventions for individuals, groups, and families. The focus will be on psychiatric nursing across the life span. Prerequisites: Satisfactory completion of didactic and practicum portions of all

previous clinical courses; Prerequisite: Satisfactory completion of NRS-500, NRS-500P, NRS-504, NRS-504P, NRS-505, NRS-506 and NRS-513.

3.00, Classroom | Web Component

NRS-514 Public Health Psychological/Mental Health Nursing

Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; Prerequisite: Satisfactory completion of NRS 500, NRS 500P, NRS 504, NRS 504P, NRS 505, NRS 506, NRS 513.

5.00, Classroom | Web Component

NRS-514P Psychological/Mental Health Nursing Practicum

Provides for clinical application of concepts learned in NRS 514. Prerequisite: Satisfactory completion of didactic and practicum portions of all previous clinical courses; satisfactory completion of NRS-505, NRS-506, NRS-513. Co-requisite: NRS-514.

2.00, Practicum | Web Component

NRS-514PA Public Health Nursing Practicum

An overview of theories and models of child/adolescent and family development is presented. Biophysical, cognitive, emotion, and family development through the life cycle are examined, and developmental, family, and nursing research are critiqued for their relevance to health promotion with children, adolescents and their families. Prerequisite: NUR 521.

2.00, Practicum | Web Component

NRS-514PB Psychological/Mental Health Nursing Practicum

Provides for clinical application of concepts learned in NRS 514.

2.00, Practicum | Web Component

NRS-515 Nursing Care of Women & Newborns

Integrates interdisciplinary, evidenced-based knowledge to provide nursing care to and promote optimal functioning of reproductive-age women, newborns, and families in states of wellness or illness.

3.00, Classroom | Web Component

NRS-515P Nursing Care Women/Newborns Practicum

Provides for clinical application of concepts learned in NRS 515.

2.00, Practicum | Web Component

NRS-516 Nursing Care Infants/Children Adolescents

Presents current research and theory for providing evidenced-based, family centered nursing care to infants, children and adolescents.

3.00, Classroom | Web Component

NRS-516P Nursing Care Infant, Children Adolescent Practicum

Provides for clinical application of concepts learned in NRS 516.

2.00, Practicum | Web Component

NRS-518 Adult & Gerontological Health Nursing

Presents current research and theory for providing evidenced-based, family centered nursing care to adults and older adults. Pre-requisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; satisfactory completion of NRS 505, NRS 506, NRS 513.

5.00, Classroom | Web Component

NRS-518P Adult & Gerontological Health Nursing Practicum

Provides for clinical application of concepts learned in NRS 518. Prerequisite: Satisfactory completion of didactic and practicum portions of all previous clinical courses; satisfactory completion of NRS 505, NRS 506, NRS 513. Co-requisite: NRS 518.

5.00, Practicum

NRS-519 Public Health Nursing

Students will learn to (1) apply public health nursing concepts and strategies to promote the health of communities and their populations and (2) collect, analyze and utilize community cultural and health data for building community capacity.

2.00, Classroom | Web Component

NRS-519P Public Health Nursing Practicum

Working in teams, students will acquire the knowledge and skills essential for building community capacity as a foundation for promoting the health of populations, families and individuals. P/N only.

1.00, Practicum

NRS-520 Case Management Across Health Care Continuum

This course is designed to provide an overview of the evolution case management and analyze contemporary models across the health care continuum. The roles and responsibilities of the case manager will be discussed. A major focus is to identify strategies that promote appropriate clinical outcomes of care and cost-efficient utilization of resources.

2.00, Online Only

NRS-521 Chemistry & Physics in Anesthesia

An introduction to principles of chemistry and physics for nurse anesthesia practice. Major emphasis is on physical chemistry, e.g., states of matter, gas laws, thermodynamics and solutions

5.00, Classroom | Web Component

NRS-523 Leading/Managing Health Care Environments I

This course, the first in a two-part sequence, provides the student with an opportunity to explore the leadership components of the advanced generalist role. Using a modular approach, the learner will analyze leadership theories and styles, as well as explore and analyze the process of managing care. Pre-requisites for Pre-licensure Students: Successful completion of Quarter I-IV; Pre-requisites for Post-licensure students: NUR-501, 510, 517, 521, 522, NRS-505, 506. GEM take for 2 credit hours only. CNL take for 4 credit hours only.
2.00-4.00, Online Only

NRS-524 Leading/Managing Environments Care II

This course provides the learner with an opportunity to explore managerial processes in clinical environments. Personnel and fiscal concepts are presented and analyzed in relation to various clinical settings. The role of the advanced generalist in managing and affecting improved outcomes of care is emphasized.
2.00-4.00, Online Only

NRS-525 Economic Policy Politics Health Care

Explores how policy and economics influence health care delivery. The learner moves from examination of broad national trends to their direct impact on practice. Learning experiences are organized so that students apply knowledge of health care policy and financing to health care issues, including practical experiences in the budgeting process and cost-effectiveness analysis.
1.00, Classroom | Web Component

NRS-526 Comprehensive Clinical Management Health Care

Provides requisite knowledge to plan, deliver, and evaluate nursing care to individuals and families with complex health care and related needs across health care settings. Selected actual and potential health alterations are used as the context within which concepts of case management, care transition, prioritization of care and discharge planning are applied. Emphasizing family centered care as a framework self-management and self-efficacy are presented as major nursing approaches. The role of the advanced generalist as a clinical leader, member of a team, and outcomes manager across health care settings are emphasized.
2.00, Class & Lab | Web Component

NRS-526PA Clinical Management in Acute Care Setting

Provides application of principles learned in NRS 526 to the acute care setting.
2.00, Practicum

NRS-526PB Clinical Management in Community Settings

Provides application of principles learned in NRS 526 to the community setting.
2.00, Practicum | Web Component

NRS-529 Advanced Pharmacology

This course covers the principles of pharmacokinetics and pharmacodynamics. The course is designed to provide the foundational knowledge requisite to understanding pharmacotherapeutics. Prerequisite: NRS 551, NRS 555.
3.00, Classroom | Web Component

NRS-530A Neonatal Pharmacotherapeutics I

This course is designed to provide advanced practice nursing students with a working knowledge of neonatal pharmacology. Course content includes the impact of neonatal physiology on drug pharmacology, special considerations in neonatal drug therapy and medications used for the diagnosis and treatment of the neonate.
1.00, 100% Online/No Bb Shell Needed

NRS-530B Neonatal Pharmacotherapeutics II

This course is designed to provide advanced practice nursing students with a working knowledge of neonatal pharmacology. Course content includes the impact of neonatal physiology on drug pharmacology, special considerations in neonatal drug therapy and medications used for the diagnosis and treatment of the neonate.
1.00, Online Only

NRS-530C Neonatal Pharmacotherapeutics III

This course is designed to provide advanced practice nursing students with a working knowledge of neonatal pharmacology. Course content includes the impact of neonatal physiology on drug pharmacology, special considerations in neonatal drug therapy and medications used for the diagnosis and treatment of the neonate.
1.00, Online Only

NRS-530D Pharmacotherapeutics Acute Care

Course provides advanced practice nurse with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan. Building on the student's knowledge of pharmacokinetics and pharmacodynamics, content includes medications used for the diagnosis and treatment of a variety of physical and psychiatric disorders and monitoring the physical, behavioral and psychiatric responses to such interventions. The course is offered in sections according to specialty area of practice.
3.00, Classroom | Web Component

NRS-530E Pharmacotherapeutics Primary Care

Course provides advanced practice nurse with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan. Building on the student's knowledge of pharmacokinetics and pharmacodynamics, content includes medications used for the diagnosis and treatment of a variety of physical and psychiatric disorders and monitoring the physical, behavioral and psychiatric responses to such interventions. The course is offered in sections according to specialty area of practice

3.00, Classroom | Web Component

NRS-530F Pharmacotherapeutics Anesthesia I

This course focuses on the pharmacokinetics and pharmacodynamics of anesthetic agents and adjunctive drugs. The interactions between anesthetics and other pharmacological substances will be discussed.

2.00, Classroom | Web Component

NRS-530G Pharmacotherapeutics Anesthesia II

This course is designed to be a comprehensive study of the pharmacokinetics and pharmacodynamics involved with the administration of anesthesia. The interactions between anesthetics and other pharmacological substances will be discussed. The effects of the aging process and varying degrees of pathophysiology on the pharmacokinetics and pharmacodynamics of anesthesia will also be studied.

4.00, Classroom | Web Component

NRS-530H Pharmacotherapeutics in Pediatrics

Course provides advanced practice nurse with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan. Building on the student's knowledge of pharmacokinetics and pharmacodynamics, content includes medications used for the diagnosis and treatment of a variety of physical and psychiatric disorders and monitoring the physical, behavioral and psychiatric responses to such interventions. The course is offered in sections according to specialty area of practice.

3.00, Online Only

NRS-530J Psychopharmacology

This course is designed to provide advanced practice nurses with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan. Building on the student's knowledge of pharmacokinetics and pharmacotherapeutics, content includes medications used for the diagnosis and treatment of a variety of psychological and psychiatric disorders and monitoring the physiological, psychiatric and behavioral responses to these interventions.

3.00, Online Only

NRS-531A Basic Principles Anesthesia Nursing

Principles and skills basic to the practice of anesthesia nursing are discussed. Focus is on patient assessment and planning care.

3.00, Classroom | Web Component

NRS-531B Advanced Principles Anesthesia Nursing

Anesthesia principles related to surgical specialties and peri-operative management discussed with emphasis upon understanding anatomic, physiologic/pathologic principles, and use of pharmacologic intervention.

3.00, Classroom | Web Component

NRS-531C Anesthesia Care Pediatric & Obstetric Patient

Anesthesia related to the specialty areas of pediatrics and obstetrics is discussed. Specific assessment and planning skills needed for these patient groups are highlighted. Prerequisite: NRS 531B. Co-requisite: NRS 541P

3.00, Classroom | Web Component

NRS-532J Family Nurse Practitioner PHC I

This course focuses on health care clinical judgment and decision making with emphasis on diagnosis, treatment, and patient care management of acute and chronic illnesses as a Family Nurse Practitioner in the pediatric population. The content also includes concepts of health maintenance, health promotion, disease prevention, and risk appraisal across the life span as it relates to the pediatric patient for diverse clients.

2.00, Classroom | Web Component

NRS-532K Family Nurse Practitioner PHC II

This course focuses on health care clinical judgment and decision making with emphasis on diagnosis, treatment, and patient care management of acute and chronic illnesses as a Family Nurse Practitioner for women's health. The content also includes concepts of health maintenance, health promotion, disease prevention, and risk appraisal across the life span as it relates to women's health patients for diverse clients. Co-requisite: NRS 541P. Prerequisite: NRS 503, NRS 538, NRS 529, NRS 530, NRS 551 and NRS 555.

2.00, Classroom | Web Component

NRS-532L FNP in Primary Health Care III

This course focuses on health care clinical judgment and decision making with emphasis on diagnosis, treatment, and management of acute and chronic illnesses as a Family Nurse Practitioner in the adult population. The content also includes concepts of health maintenance, health promotion, disease prevention, and risk appraisal across the life span as it relates to the adult patient for diverse clients.

3.00, Classroom | Web Component

NRS-532LA FNP Primary Health Care III, Part A

This course focuses on health care clinical judgment and decision making with emphasis on diagnosis, treatment, and management of acute and chronic illnesses as a Family Nurse Practitioner in the adult population. The content also includes concepts of health maintenance, health promotion, disease prevention, and risk appraisal across the life span as it relates to the adult/geriatric patient for diverse clients.

1.00, Online Only

NRS-532LB FNP Primary Health Care III, Part B

This course focuses on health care clinical judgment and decision making with emphasis on diagnosis, treatment, and management of acute and chronic illnesses as a Family Nurse Practitioner in the adult population. The content also includes concepts of health maintenance, health promotion, disease prevention, and risk appraisal across the life span as it relates to the adult/geriatric patient for diverse clients.

1.00, Online Only

NRS-532M FNP Primary Health Care IV

This course focuses on health care clinical judgment and decision making with emphasis on diagnosis, treatment, and patient care management of acute and chronic illnesses as a Family Nurse Practitioner in the adult population. The content also includes concepts of health maintenance, health promotion, disease prevention, and risk appraisal across the life span as it relates to the adult/geriatric patient for diverse clients.

2.00, Online Only

NRS-532N Population Health Assessment & Planning

This course focuses on an application of the concepts and methods of assessing health status among community groups and populations within the health planning process. Various conceptual frameworks and principles of epidemiology are incorporated to guide the process of assessing populations. Analyses of population assessments and studies provide understanding of community needs and resources. Emphasis will be given to data collection and analysis as the foundation of planning interventions for populations/aggregates.

2.00, Classroom | Web Component

NRS-532P Population Program Implementation & Evaluation

This is the second of two sequential courses in population health assessment and program planning. The course is organized around planning as a method of decision-making. Various theoretical frameworks are applied to the development of a plan to meet the health needs of selected populations at-risk, based on an in-depth population assessment. Formulation of

implementation strategies and evaluation schemes for sustainable program development are discussed. Emphasis is on implementation and evaluation methods for innovative nursing practice with populations and/or communities. This course is designed to prepare public health nurses and nurse practitioners to plan with an identified target population/organization to respond to population health needs.

2.00, Classroom | Web Component

NRS-533F Advanced Primary Care of Child I

The course focus is on the development of critical thinking and clinical judgment. A chronological approach is used to address preventive health care services, and the identification and management of common health problems found in infants, children and adolescents. PNP and AC-PNP take for 3 credit hours. NNP take for 2 credit hours only.

3.00, Online Only

NRS-533G Advanced Primary Care of Child II

The course content provides the theoretical basis for clinical judgment and decision making skills for providing primary care to ill children and their families. A systems approach is used to focus on assessment and management of acute and chronic health problems.

3.00, Classroom | Web Component

NRS-533H Advanced Primary Care of the Child III

The course enhances clinical judgment and decision making skills required in providing primary care to children with complex physical and psychosocial needs. A systems approach is used to focus on assessment and management of complex health problems.

3.00, Classroom | Web Component

NRS-533N Neonatal Management I High Risk Family

Course introduces the role of the NNP in the management of normal and high-risk families and their infants. The focus of the course is on development of a conceptual framework for neonatal advanced practice nursing with childbearing families and their newborns. The development of skills in the assessment and management of families with high-risk neonates during all phases of the childbearing process (antenatal, intrapartum, post-partum and the neonatal periods).

3.00, Online Only

NRS-533P Neonatal Management II: High Risk Neonate

Continuation of NRS 533N. Focus on the assessment, pathophysiology, stabilization and management of high-risk neonates with problems of low to moderate acuity. Role of skills such as intubation, thoracentesis, tube thoracotomy, lumbar puncture, supra-pubic bladder aspiration, percutaneous central venous catheter

insertion, umbilical vessel catheterization, and peripheral arterial line insertion are included. Ethical issues and care of the family in crisis are also emphasized.

3.00, Classroom | Web Component

NRS-533Q Neonatal III: Critical Ill Neonate

This course provides the student with the theoretical and practical knowledge needed for the role of the NNP in the neonatal intensive care unit (NICU). Content will focus on the assessment, pathophysiology, stabilization and management of critically ill neonates (high acuity).

3.00, Classroom | Web Component

NRS-533R Pediatric Acute/Chronic Care I

Students are prepared to meet the specialized needs of patients with complex acute, critical, and chronic health conditions. Recognition and management of emerging health crises and organ dysfunction/failure, patient stabilization, minimization of complications, promotion of physical and psychological well-being, restoration of maximal health potential, and evaluation for risk factors in achieving these outcomes will be emphasized. Pertinent physiology, pathophysiology, and pharmacology are integrated into each lecture. The courses NRS 533R and NRS 533S are designed to be taken concurrently with NRS 541P Master's Practica.

3.00, Classroom | Web Component

NRS-533S Pediatric Acute/Chronic Care I

Students are prepared to meet the specialized needs of patients with complex acute, critical, and chronic health conditions. Recognition and management of emerging health crises and organ dysfunction/failure, patient stabilization, minimization of complications, promotion of physical and psychological well-being, restoration of maximal health potential, and evaluation for risk factors in achieving these outcomes will be emphasized. Pertinent physiology, pathophysiology, and pharmacology are integrated into each lecture. The courses NRS-533R NRS-533S are designed to be taken concurrently with NRS-541P Master's Practica.

3.00, Classroom | Web Component

NRS-534A Management Adult Patient: Acute/Critical Illness I

Recognition and management of selected common acute and chronic health care problems in the adult. Prevention, screening, diagnosis, treatment, and counseling adult patients form the framework for students to refine clinical decision-making and critical thinking skills. Illness management, health promotion, and risk reduction are integrated into the assessment and management plans for adult patients.

4.00, Classroom | Web Component

NRS-534B Management Adult Patient: Acute/Critical Illness II

Recognition and management of selected common acute and chronic health care problems in the adult. Prevention, screening diagnosis, treatment and counseling adult patients form the framework for students to refine clinical decision-making and critical thinking skills. Illness management, health promotion, and risk reduction are integrated into the assessment and management plans for adult patients.

3.00, Classroom | Web Component

NRS-534C Adult Patient: Acute/Critical Illness

The focus of this course is the recognition and management of selected problems associated with acute and critical illness. Emphasis is placed on fine tuning clinical decision making and critical thinking skills through the integration of assessment, diagnosis and development of a management plan designed of to meet the special needs of the critically ill adult. Prerequisite: NRS 534B

4.00, Classroom | Web Component

NRS-534D Adult Patient: Women's Health

This course examines women's health issues in primary care. Emphasis is placed on primary care management of common health problems and psychosocial/cultural issues of adolescent and adult women.

1.00, Classroom | Web Component

NRS-534E Management of the Adult Patient: Frail Elderly

This course focuses on care of the elderly. Emphasis is placed on assessment and management of the frail elderly by the primary care provider. Issues pertinent to the older population are also addressed.

2.00, Online Only

NRS-535A Diagnostics Management I: Assessment & Planning

This course will focus on the interview as a method for gathering pertinent data in order to conduct a diagnostic evaluation and make appropriate treatment recommendations with clients demonstrating psychiatric symptoms. Prerequisite: NRS 563.

3.00, Online Only

NRS-535B Diagnostics Management II: Evidence Treatment

Theoretical basis for psychotherapeutic nursing interventions is examined from a developmental perspective. The collaborative work of nurse and client is examined from initial contact through termination.

3.00, Online Only

NRS-535C Group Process, Strategies Intervention

In depth analysis of theory and research is presented as a basis for the clinical practice of group psychotherapy. Selected group approaches and matching interventions are explored, practiced, and evaluated. Method of delivery is web-based.

3.00, Online Only

NRS-535E Diagnostics Management of Child Mental Health Disorders

The focus of the course is child mental health assessment and management of child mental health disorders using the DSM IV-TR taxonomy and practice guidelines. Included are the essentials of report writing, consideration of cultural issues, co-morbidities, and parent-child information issues.

2.00, Online Only

NRS-538 Diagnostics Advanced Practice Nurse

This course has been developed to prepare the advanced practice nurse for the use, interpretation, and application of laboratory and diagnostic techniques and procedures. The student will interpret data to develop critical thinking and decision-making skills in specialty areas of practice across the lifespan.

3.00, Online Only

NRS-539PA Leadership Practicum

This practicum provides the student with an opportunity to explore and apply leadership theories and principles in developing and planning an evidence-based project to improve care outcomes or microsystem processes. The Leading and Managing sequence (NRS 523 and NRS 524) is pre- or co-requisite with this course. NRS 539PA and PB must be taken in sequence.

Prerequisites: NRS 501, 522, 505, 506, 517, 504/504P, 507, 510, 521, 523. Pre or Co-Requisites: NRS 523, 524.

2.00, Online Only | Practicum

NRS-539PB Leadership Practicum

This practicum provides the student with an opportunity to explore and apply leadership theories and principles in developing and planning an evidence-based project to improve care outcomes or microsystem processes. The Leading and Managing sequence (NRS 524 and NRS 525) is pre- or co-requisite with this course. NRS 539PA and PB must be taken in sequence.

Prerequisites: NRS 501, 522, 505, 506, 517, 504/504P, 507, 510, 521, 523, 524. Pre or Co-requisites: NRS 524, 525.

2.00, Online Only | Practicum

NRS-541P Master's Practica

A minimum of 12 quarter hours of specialty practice are planned conjointly by the master's student and faculty member. Prerequisite or co-requisite: Core courses as determined by

each program. Selected NRS-531-536, RN licensure. Clinical conference is included. Post-master's student requirements are individually determined. P/N grading.

1.00-12.00, Practicum | Web Component

NRS-542 Nurse Practice Validation - Anesthesia

This is a specialty seminar in nurse anesthesia designed to assess theoretical and clinical knowledge. A case discussion format is used that encompasses basic and advanced principles of nurse anesthesia with relevant physiological, pathophysiological, pharmacological information. Successful completion of this course provides credit for NRS-531A, NRS-531B, and NRS-531C in the nurse anesthesia curriculum as well as NRS-551, NRS-552 and NRS-554, NRS-555. May be repeated for a minimum of 9 hours for the Anesthesia Nurse Post-certificate master's program.

1.00-9.00, Online Only

NRS-542A Nurse Practice Validation - Anesthesia

This is a specialty seminar in nurse anesthesia designed to assess theoretical and clinical knowledge. A case discussion format is used that encompasses basic and advanced principles of nurse anesthesia with relevant physiological, pathophysiological, pharmacological information. Successful completion of this course provides credit for NRS-531A, NRS-531B, and NRS-531C in the nurse anesthesia curriculum as well as NRS-551, NRS-552 and NRS-554, NRS-555. May be repeated for a minimum of 9 hours for the Anesthesia Nurse Post-certificate master's program.

1.00-9.00, Classroom

NRS-543 Community Strategies Adolescent Health

Research-based course will examine epidemiology of various adolescent health issues. Topics will include adolescent health behaviors and group-focused strategies and programs to deal with the issues. Pre- and co-requisite: NRS 567 and NUR 521

3.00, Online Only

NRS-544 Role Nurse Educator Clinical Environment

This on-line course is designed to prepare nurses for clinical teaching. The course includes clinical educational theories, research, strategies, and evaluation of students.

2.00, Online Only

NRS-545 Role of Nurse Educator - Class Room

On-line course for classroom teaching with modules on learning style assessment, lecture development, student critical thinking, evaluation methodologies, conceptual frameworks and curriculum design.

2.00, Online Only

NRS-546 Issues in Pain Relief

Students explore the various theories of pain and how pain relief strategies evolve from these theories. The application of this knowledge to selected nursing practice situations is emphasized. 2.00, Online Only

NRS-547 Academic Scholarship - Nursing Education

This web-based course addresses crucial aspects of nursing education that graduates will need to function as leaders in academia. Designed in a modular format, the National League for Nursing Core Competencies of Nursing Education provides the foundation for course content. Students will enroll in 1-3 credit hours based on prior teaching experiences and recommendations from their advisors. 1.00-3.00, Online Only

NRS-547P Academic Scholarship in Nursing Education

Individually designed practicum experiences will be arranged which best support student interest and learning needs relative to nursing education. Practicum experiences will be congruent with content presented in NRS 546 and may include clinical teaching, classroom teaching, and/or on-line teaching. Pass/No pass grading. 1.00-3.00, Practicum | Online Only

NRS-548 MSN Capstone

This course provides the graduating master's student with the opportunity to demonstrate knowledge of essential theory, incorporate research findings, demonstrate scholarly thought and application/focus to a population/problem, and contribute to the body of nursing knowledge. This project may be either an Evidence-Based Practice Protocol or a Case Study/Management Project. It must be presented in both written and oral form. 1.00, Classroom | Web Component

NRS-550 Clinical Immersion & Role Synthesis

Provides an opportunity for the learner to apply concepts and theory of nursing care and leadership in a clinical setting of their interest. Prerequisites: Satisfactory completion of all didactic and practicum courses in the Advanced Generalist program. 1.00-12.00, Clinical | Web Component

NRS-551 Advanced Physiology I

A two course sequence with an emphasis upon normal body system regulation and integration. The importance of control through information between systems, as well as interdependency at all levels is stressed. May be taken out of sequence. Prerequisite: undergraduate anatomy and physiology or equivalent. 4.00, Classroom | Web Component

NRS-552 Advanced Physiology II

A two course sequence with an emphasis upon normal body system regulation and integration. The importance of control through information between systems, as well as interdependency at all levels is stressed. May be taken out of sequence. Prerequisite: undergraduate anatomy and physiology or equivalent 2.00, Classroom | Web Component

NRS-554 Advanced Pathophysiology I

A case study approach is utilized to identify basic principles of pathophysiology and analyze pathophysiological alterations occurring in selected disease processes. The use of appropriate clinical and laboratory data for assessment is emphasized. The application of course content to clinical case studies and vignettes enhances synthesis and critical thinking. Prerequisite: undergraduate anatomy and physiology or equivalent. 2.00, Classroom | Web Component

NRS-555 Advance Pathophysiology II

A case study approach is utilized to study pathophysiological alterations occurring in selected system-related disease processes. The use of appropriate clinical and laboratory data for assessment is emphasized. The application of course content to clinical case studies and vignettes enhances synthesis and critical-thinking. Prerequisite: undergraduate anatomy and physiology or equivalent. 4.00, Classroom | Web Component

NRS-556 Developmental Physiology Fetus Neonate

This course is designed to provide the student with greater depth of understanding of developmental physiology of the fetus and neonate. Principles of growth and development, genetics/teratogenesis, embryology, and maturation of organ systems as related to critical periods of intrauterine development, transition to extrauterine life, and through early infancy will be covered. Adaptation to physiologic stress and alterations from normal will also be discussed. 3.00, Online Only

NRS-557 Neonatal Pathophysiology I

This didactic course provides the graduate student with an in depth analysis of advanced neonatal pathophysiology. A case study approach will be used to explain system-related pathophysiology during the neonatal period. 2.00, Online Only

NRS-558 Neonatal Pathophysiology II

This didactic course provides the graduate student with an in depth analysis of advanced neonatal pathophysiology. A case study approach will be used to explain system-related pathophysiology during the neonatal period. 2.00, Online Only

NRS-559 Neuropathophysiology: Lifespan Approach

This course is designed to provide advanced practice nurses with knowledge of the essential neuropathophysiology of mental illness, across the lifespan. Building on the basics of cell physiology and neural transmission, this course focuses on the neurobiology of select serious mental illnesses. There is emphasis throughout on the neural structures and functions thought to be implicated in symptom presentation and disease progression of select serious mental illnesses.

3.00, Online Only

NRS-560 Advanced Generalist Capstone Project

Provides for an opportunity to synthesize all previous learning in the Advanced Generalist curriculum and apply theories, concepts, and principles to a clinical issue of interest. Prerequisites: Satisfactory completion of all previously prescribed didactic and practicum courses in the Advanced Generalist program.

1.00, Classroom | Web Component

NRS-561 Comprehensive Examination

A comprehensive end-of-program examination. P/N grading.

1.00, Classroom

NRS-562 Child/Family Development Through Lifespan

An overview of theories and models of child/adolescent and family development is presented. Biophysical, cognitive, emotion, and family development through the life cycle are examined, and developmental, family, and nursing research are critiqued for their relevance to health promotion with children, adolescents and their families.

3.00, Online Only

NRS-563 Major Psychopathology Disorders

This course will focus on the epidemiology, etiology, clinical manifestation and treatment of selected disorders across the lifespan. Emphasis will be placed on assessment and interventions in a variety of settings. This emphasis will also include the impact of culture on diagnosis and treatment of selected disorders and a critical evaluation of relevant research findings.

3.00, Online Only

NRS-564 Basis of Environmental Health

This course provides an overview of the core principles in environmental health. Emphasis is on application of basic concepts to address specific environmental hazards.

1.00-3.00, Online Only

NRS-565 The Older Adult

This course considers the changing age demographics, the multiple theoretical perspectives of old age, as well as some of the

major problems and issues confronting aged persons and society. Also, the impact of an aging society on social policy is addressed.
3.00, Online Only

NRS-566 Frameworks for Health Promotion

The course will review some of the more common frameworks used in health promotion research and practice. Students will critique models and discuss the applicability to nursing research and practice. This course may be taken by MSN or DNSc students. The focus for MSN students is on applicability to practice and for DNSc students; the focus is on synthesis and critique of the models for clinical research. Each group has its own section of the course. Prerequisite: NUR 521.

3.00, Online Only

NRS-567 Applied Epidemiology

Principles and methodologies of epidemiology are presented, including factors that influence the health status of individuals and populations. A framework is given for assessing measures of disease frequency and association, patterns of disease, and identification and analysis of health risk. Pre- or co-requisite: NUR 510.

3.00, Online Only

NRS-586 Introductory Multivariate Statistics

This is an on-line course which introduces the student to the elementary concepts of multivariate statistics. Topics include missing data, analysis of co-variance, multivariate analysis of variance, principle components, factor analysis and discriminant analysis. Prerequisite: NUR 510 or equivalent.

4.00, Online Only

NRS-600P APN Residency

This course is designed to provide advanced practice nursing with an opportunity to develop clinical competency in the advanced practice role. The experience is accomplished under the guidance of an approved preceptor after completion of all program of study courses. Students register for 2 credits each quarter until the residency is completed. The number of clock hours of residency is determined by each curriculum. The course is taken under the pass/no pass provision.

2.00-7.00, Classroom | Practicum | Web Component

NRS-600P APN Residency

This course is designed to provide advanced practice nursing with an opportunity to develop clinical competency in the advanced practice role. The experience is accomplished under the guidance of an approved preceptor after completion of all program of study courses. Students register for 2 credits each quarter until the residency is completed. The number of clock hours of residency

is determined by each curriculum. The course is taken under the pass/no pass provision.

1.00-7.00, Classroom | Practicum

NRS-600PA Residency in Anesthesia Nursing & Advanced Role Development

A 52-week, 4-quarter residency following completion of the anesthesia nursing curriculum which provides the opportunity of clinical proficiency in anesthesia practice. Includes journal clubs and conferences. Prerequisite: NRS 531C.

7.00, Classroom | Practicum | Web Component

NRS-601 Understanding Scientific Paradigms

This course provides a foundation in relevant philosophies of science that have influenced scientific thought in nursing. The learner will examine how philosophies of science influence understanding of phenomena, the choice of research methods and the interpretation of research findings.

3.00, Online Only

NRS-602 Developmental Conceptual Understanding Clinical Phenomena

This course provides the learner with the opportunity to explore a concept embedded within a particular context or phenomenon of interest. The learner will do an extensive integrative review of the literature and develop understanding of the evolution of their concept of interest.

3.00, Online Only

NRS-603 Integrating Models Framework Development

This course provides the learner with an opportunity to develop or expand a theoretical framework that will guide their Advanced Clinical Research Practicum and their dissertation research. Integration of the literature is emphasized.

2.00, Online Only

NRS-604 Developing Professional Writing Skills

This course assists students to develop their publication knowledge and skills. Issues related to the publication process will be explored. Emphasis is on health science writing and publication in journal articles.

2.00, Online Only

NRS-605 Ethical Conduct/Research Set

This course provides the student with an interactive format to discuss the researcher's responsibilities for conducting ethically sound scientific research as well as select ethical issues in research. Students will analyze an ethical issue as it relates to their own research area.

2.00, Online Only

NRS-649 DNP Practice Immersion Residency

A minimum of eight credit hours of DNP practice immersion are planned conjointly by the nurse doctorate student the Rush faculty advisor and the site mentor. P/N grading. Prerequisite or co-requisite: NRS 651-659, admission to DNP program.

4.00-8.00, Online Only

NRS-650A Project Planning

This internet-guided clinical course is part of a four-quarter sequence required of all DNP students. The clinical experience is planned conjointly by the DNP student and the Rush faculty advisor. The course focus is on identifying measurement tools, a project timeline, needed resources, and a preliminary budget within the context of the clinical experience.

2.00, Online Only

NRS-650B Project Planning

This Internet-guided clinical course is part of a five-quarter sequence required of all DNP students. The clinical experience is planned conjointly by the DNP student and the Rush faculty advisor. The course focus is on developing the design and evaluation plan of the DNP change project within the context of the clinical experience. The final project proposal will be completed in NRS 650D

1.00, Online Only

NRS-650C Project Planning

This Internet-guided clinical course is part of a four-quarter sequence required of all DNP students. The clinical experience is planned conjointly by the DNP student and the Rush faculty advisor. The course focus is on developing and presenting orally the DNP project proposal and using feedback from fellow students and the Rush faculty advisor to refine the project proposal within the context of the clinical experience. The final written project proposal is completed in NUR 650D. This is a writing intensive course.

1.00, Online Only

NRS-650D Project Planning

This Internet-guided clinical course is part of a five-quarter sequence required of all DNP students. The clinical experience is planned conjointly by the DNP student and Rush faculty advisor. The course focus is on completing and submitting the proposal for the DNP change project within the context of the clinical experience. This is a writing intensive course.

1.00, Online Only

NRS-651 The Leader As Catalyst for Change

Course covers topics related to the relationship between leadership qualities and organizational change.

2.00, Online Only

NRS-653 Understanding Finance/Business Concepts

This course covers basic concepts and techniques for financial management of healthcare programs and organizations. Through readings, weekly assignments, and online discussions, the student will be able to knowledgeably participate in financial planning and decision-making.

3.00, Online Only

NRS-654 Organizational Analysis & Evaluation

Course covers skills needed to design and conduct an organizational analysis and a program evaluation

2.00, Online Only

NRS-655 Data & Decision Making in Rapid Changing Environments

The student will acquire and demonstrate the skills to effectively utilize data in the rapidly changing health care environment.

2.00, Online Only

NRS-656 Outcomes Management

Outcome measurement in the clinical setting. Topics include use of outcome measurement frameworks, selection of outcome measures and use of outcome data.

2.00, Online Only

NRS-658 The Leader & Policy, Political, Power and Ethics

Course explores the use of political and policy development strategies to produce change. Topics include ethical issues related to leadership and policy development.

2.00, Online Only

NRS-659 Human Resource Management

Course covers topics, laws, and strategies related to human resource management.

2.00, Online Only

NRS-661 Developing a Leadership Plan

This web-based course is the first of a two-part series of leadership seminars. Students will be introduced to models of effective nursing leadership and principles of leadership plan development. The major learning outcome will be the development of a personal leadership e-portfolio, in conjunction with a mentor that will facilitate acquisition of leadership competencies commensurate with career goals.

3.00, Online Only

NRS-662 Examining Core Leadership Competencies

This web-based course is the second of a two-part series of leadership seminars. Students will examine core leadership competencies and begin to implement their personal leadership e-portfolios, revising them as necessary.

3.00, Online Only

NRS-664 Understanding/Design Project Plan

The focus for this course is to enable the student to understand the program/project planning process and begin to design the program/project. This is a writing intensive course.

3.00, Online Only

NRS-669 Evaluating Change

Clinical seminar. Topics support student projects as they evaluate change project.

2.00, Online Only

NRS-670 Role Transformation

Course meets with DNP Capstone course. Topics include role transition and career development

1.00, Online Only

NRS-671 Research Process: Multi-Method Perspective

Emphasis is on the concepts related to the significance, innovation and development of scientific questions and the importance of translating and disseminating findings to scientific and lay communities.

4.00, Online Only

NRS-672 Research Process Quantitative Design

Development, integration and application of the knowledge, attitude and skills required to function as a clinical nurse scientist. Emphasis is on the critical appraisal of selected sampling designs relevant to quantitative research.

3.00, Online Only

NRS-673 Research Process: Quantitative Method

Development, integration and application of the knowledge, attitudes and skills required to function as a clinical nurse scientist. Emphasis is on measurement, intervention fidelity, data management, and instrument development.

3.00, Online Only

NRS-674 Research Process: Qualitative Design

Focus is on selected issues in the design, conduct and the reporting of qualitative research. Emphasis is on the critical appraisal of selected qualitative research methodologies and design.

3.00, Online Only

NRS-675 The Research Process: Qualitative Methods

Focus is on concepts related to the integrity of the qualitative research process including data management, analysis and interpretation of findings.

3.00, Online Only

NRS-677 DNP Capstone Project

Students present and critique capstone projects. Course requires 2-3 day on-site attendance.
2.00, Online Only

NRS-678 Leading & Evaluating Change

The purpose of this course is to enable students to successfully lead and evaluate change projects in the health care environment.
3.00, Online Only

NRS-689 Developing Grantsmanship Skills I

This first of a two-course sequence assists students to develop predoctoral grantsmanship skills. The course focuses on locating predoctoral and other grant resources, and developing grant writing, time management and critiquing skills. The major learning outcome is that students will complete a preliminary draft of selected portions of a National Research Service Award (NRSA) Predoctoral Application (F31).
2.00, Online Only

NRS-690 Developing Grantsmanship Skills II

This second, of a two-course sequence assists students to further develop predoctoral and post grantsmanship skills. This course focuses on polishing grant writing skills; refining grant review and critiquing skills; expanding skills of interdisciplinary and multidisciplinary collaboration; and developing beginning post grantsmanship skills. The major learning outcome is that students will have a more refined and working draft of an entire NRSA Predoctoral Application (F31).
2.00, Online Only

NRS-691 Advanced Clinical Research Practicum

A minimum of 12 credit hours of individually designed courses of independent study are planned conjointly by the doctoral student and academic advisor. Pass/No Pass grading. The successful completion of these hours, a submitted paper and verbal presentation constitutes the achievement of candidacy status.
1.00-12.00, Online Only

NRS-699 Dissertation Research

The student contracts with faculty members and Associate Dean for Academic Affairs for independent research. The doctoral candidate must be enrolled for at least three quarter hours each quarter or until the dissertation has been defended. The successful dissertation defense constitutes a submitted paper and verbal defense.
5.00, Online Only

NRS-900A Independent Study

Student contracts with faculty member to complete an academic independent study in a selected area of nursing content.
1.00-12.00, Independent Study

NRS-900B Independent Clinical Study

Intensive independent study in a specialty clinical area of nursing with faculty contract. RN Licensure and admission to the College of Nursing.
1.00-12.00, Clinical

NRS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
1.00, Continuous Enrollment

NSG-495 Comprehensive Examination

A comprehensive end-of-program examination. P/N grading.
1.00, Classroom

NSG-500 Socialization into Nursing Seminar

Historical, theoretical and ethical underpinnings of the discipline, as well as professional standards that guide practice are used to assist the learner in understanding nursing as a scientific discipline and a social phenomenon, and in developing a personal philosophy to guide professional nursing practice.
1.00, Classroom | Web Component

NSG-501 Role of Professional Nurse

This course presents concepts essential to the practice of client/patient and family-centered nursing across the lifespan. Students will examine essential physiological and psychosocial concepts, the professional role, and introductory clinical reasoning, while respecting individual and cultural diversity.
3.00, Classroom | Web Component

NSG-501P Role Professional Nurse Practicum

The learner will use clinical reasoning to holistically address client's/patient's health and wellness needs. Learner will apply psychosocial and physiological concepts, therapeutic communication, pathophysiology, biostatistics and epidemiology to diverse clients/patients and families in a variety of settings. Focus will be on the patient/client within the context of the client/patient system.
3.00, Classroom | Web Component

NSG-502 Nursing Management: Common Health Alterations Across the Lifespan

This course presents physiological, psychosocial, cultural, developmental and ethical concepts of common acute or exacerbated health alterations across the life span. Concepts of health promotion and disease prevention are introduced using evidence-based interventions. Inter- and intra-professional collaboration for ensuring quality health outcomes is emphasized.

3.00, Classroom | Web Component

NSG-502P Nursing Management: Common Health Alterations-Practicum

This course provides an opportunity for the learner will apply concepts learned in the didactic portion of the course to the care of patients across the lifespan experiencing common acute or exacerbated health alterations.

3.00, Practicum | Web Component

NSG-503 Psychiatric & Mental Health Nursing Practice

This course examines the etiology, manifestations, and clinical management of selected mental illnesses across the life span and continuum of care. Students will analyze systems and the evidence base for psychiatric nursing and apply this knowledge in promoting mental health and the optimal functioning and rehabilitation of individuals, families, and communities with mental health problems. Prerequisite: Nursing Management of Common Health Alterations Across the Lifespan; Corequisite: Psychiatric and Mental Health Nursing Practicum

3.00, Classroom | Web Component

NSG-503P Psychiatric & Mental Health Nurse Practicum

This clinical practicum provides the learner with the opportunity to develop clinical competence in psychiatric and mental health clinical settings. Emphasis is placed on the development and maintenance of the therapeutic relationship with clients/patients and families across the continuum of care. Prerequisite: Nursing Management of Common Health Alterations Across the Lifespan Practicum; Corequisite: Psychiatric and Mental Health Nursing

3.00, Classroom | Practicum | Web Component

NSG-504 Women's Health Across the Life Span

This course presents physiological, psychosocial, cultural, developmental and ethical issues of women's health across the life span, including pregnancy and birth. Concepts of health promotion and disease prevention are stressed using evidence-based interventions. Inter- and intra-professional collaboration for ensuring quality health outcomes is emphasized.

3.00, Classroom | Web Component

NSG-504P Women's Health Nursing

This course provides clinical practice opportunities for students to manage the care of women, newborns, and the childbearing family. Students will integrate evidenced-based health promotion and health maintenance information when teaching and developing nursing plans of care for women, newborns and the childbearing family.

1.00, Practicum | Web Component

NSG-505 Public Health Nursing

This course uses an ecological model to assess the nursing care needs of individuals, families and groups in the community. Evidence based strategies to promote health and reduce risk for individuals, families and groups are analyzed within the context of the communities in which they live. The impact of public health laws and regulations on public safety and access to care are examined. Prerequisite: NSG-522 and NSG-524; Corequisite: NSG-504 and NSG-508P

3.00, Classroom | Web Component

NSG-505P Public Health Nursing Practicum

This course provides the opportunity for the learner to apply knowledge and skills in providing nursing care across the lifespan for individuals, families, and groups in community settings. The learner will apply the ecological model to integrate evidence-based health promotion, prevention, and risk reduction strategies for individuals, families and groups within the context of the communities in which they live. The impact of public health laws and regulations on public safety and access to care are examined.

2.00, Clinical | Web Component

NSG-506 Nursing Management of Complex Health

This course presents Physiological, psychosocial, cultural, development and ethical concepts in the case management of complex health alterations across the life span. Inter- and intra-professional collaboration for ensuring quality health outcomes is emphasized, LT grade

3.00, Classroom | Web Component

NSG-506P Nursing Management of Complex Practicum

This course provides an opportunity for the learner to apply concepts learned in the didactic portion of the course to the care of patients across the lifespan experiencing complex health alterations. P/F grade

3.00, Classroom | Web Component

NSG-507 Comprehensive Examination

A comprehensive end-of-program examination

1.00, Classroom | Web Component

NSG-508P Integrated Clinical

This course presents physiological, psychosocial, cultural, developmental and ethical issues of women's health across the life span, including pregnancy and birth. Concepts of health promotion and disease prevention are stressed using evidence-based interventions. Inter-and intra-professional collaboration for ensuring quality health outcomes is emphasized. P/F
3.00, Classroom | Web Component

NSG-510 Pathophysiology: Advanced Generalist

This course provides a conceptual, lifespan approach to alterations in normal anatomic structure and function. General and system specific concepts related to causation and clinical presentation of pathophysiology will be discussed. This course will provide the foundation for the application of pathophysiologic concepts to common clinical situations. Critical thinking is emphasized. Application of evidence-based pathophysiologic research will be discussed. Prerequisite: Anatomy and physiology
3.00, Classroom | Web Component

NSG-511 Pharmacology: Advanced Generalist

This course provides a conceptual, lifespan approach to understanding the principles of pharmacokinetics and pharmacodynamics that provide the foundational knowledge critical to understanding pharmacotherapeutics. Critical thinking is emphasized. Application of research is discussed.
3.00, Classroom | Web Component

NSG-512 Clinical Leadership

Using a case-based approach, this course provides the learner with an opportunity to apply concepts and principles of clinical leadership and quality improvement to address issues related to care outcomes.
3.00, Classroom | Web Component

NSG-513 Capstone Seminar: Advanced Generalist

This course provides the student with the opportunity to integrate the knowledge and skills acquired throughout the clinical nurse leader program. The focus of the capstone project is the development of an evidence-based plan to improve healthcare outcomes for a patient cohort/population.
1.00, Classroom | Web Component

NSG-513 Capstone: Clinical Leader (pre-licensure)

This course provides the student with the opportunity to integrate the knowledge, skills and cultural awareness acquired throughout the clinical leader program. The focus of the capstone project is the development of an evidence-based plan to improve healthcare outcomes for a patient/population cohort.
3.00, Classroom | Web Component

NSG-513A Capstone Seminar: Clinical Leader (post-licensure)

This course provides the student with the opportunity to integrate the knowledge, skills and cultural awareness acquired throughout the clinical leader program. The focus of the capstone project is the development and implementation of an evidence-based plan to improve health care outcomes for a patient/population cohort.
1.00, Classroom | Online (75% or Greater)

NSG-514 Immersion & Capstone: Clinical Leader

This clinical course expands the student's clinical competency and integrates the role of the Clinical Nurse Leader in a variety of clinical settings. The student will demonstrate progressive competence and independence in meeting the clinical objectives throughout the experience. Students will use this clinical experience to develop and/or implement the Capstone project.
6.00, Classroom | Web Component

NSG-514 Immersion & Capstone: Clinical Leader

This clinical course expands the student's clinical competency and integrates the role of the Clinical Nurse Leader in a variety of clinical settings. The student will demonstrate progressive competence and independence in meeting the clinical objectives throughout the experience. Students will use this clinical experience to develop and/or implement the Capstone project.
9.00, Classroom | Web Component

NSG-514 Immersion: Clinical Leader (pre-licensure)

This clinical course expands the student's clinical competency and integrates the role of the Clinical Nurse Leader in a variety of clinical settings. The student will demonstrate progressive competence and independence in meeting the clinical objectives throughout the experience. Students will use this clinical experience to develop and/or implement the Capstone project.
7.00, Classroom | Web Component

NSG-515 Immersion & Capstone: CNL

This clinical course expands the student's clinical competency & integrates the role of the Clinical Nurse Leader in a variety of clinical settings. The student will demonstrate progressive competence & independence in meeting the clinical objectives throughout the experience. Students will use this clinical experience to develop and/or implement the Capstone project.
P/F grade
6.00, Classroom | Online Only

NSG-516 Nursing Care of the High Risk Newborn

This course provides the student with an overview of high-risk neonatology and the nurse's role in providing care to this unique population. The focus of this course is the application of

evidence-based interventions to improve outcomes of care for the neonate and the neonate's family. LT
3.00, Online Only

NSG-520 Applied Epidemiology

Principles and methodologies of epidemiology are presented, including factors that influence the health status of individuals and populations. A framework is given for assessing measures of disease frequency and association, patterns of disease, and identification and analysis of health risks. Issues in determining inference from epidemiological studies are discussed. The application of epidemiology to clinical practice is presented.
2.00, Online Only

NSG-521 Organizational & Systems Leader

This course provides the student with an opportunity to explore organizational and leadership theories, and analyze the process of managing change. The effects of operational and managerial processes on practice environments that affect outcomes, quality, safety and cost effectiveness of patient care are discussed. Ethical leadership principles and role development underpin the course content. Clinical informatics as a component of healthcare is integrated throughout the course.
3.00, Online Only

NSG-522 Applied Epidemiology Biostatistics Nursing

This course develops students' ability to apply epidemiological and statistical concepts to guide evidence-based practice in a dynamic health care environment at the micro and mezzo level. Students use public data sources, data management software and the published literature to understand and address health concerns in populations, and in evaluating economic evidence of health interventions and programs.
3.00, Online Only

NSG-523 Research for Evidence Based Practice

Students will develop an understanding of the research process and how research evidence influences practice. Students will identify appropriate practice questions and use multiple methods and informatics to systematically obtain sound evidence about practice questions. Students will critically analyze and apply research evidence to improve practice outcomes in culturally diverse populations.
3.00, Online Only

NSG-524 Health Promotion in Individuals & Clinical Populations

Students will use theories and models to examine determinants of health and to guide health promotion and illness/injury

prevention strategies and practice. Students will use informatics to gather and evaluate health data, locate and utilize evidence based practice strategies and evaluate quality of health information.
3.00, Classroom | Web Component

NSG-525 Health Assessment Across the Lifespan

This course is designed to teach the didactic components of a comprehensive history and physical examination of individuals/families across the lifespan and the documentation of findings. The course provides a framework of critical thinking based on careful collection of history and physical findings and their systematic analysis. The course content is organized around assessment of specific body systems of individuals/families across the lifespan.
2.00, Classroom | Web Component

NSG-525L Health Assessment Lab: Advanced Generalist

This course is designed to teach the didactic components of a comprehensive history and physical examination of individuals/families across the lifespan and the documentation of findings. The course provides a framework of critical thinking based on careful collection of history and physical findings and their systematic analysis. The course content is organized around assessment of specific body systems of individuals/families across the lifespan.
1.00, Classroom | Online (75% or Greater)

NSG-531 Advanced Pharmacology

This course covers the principles of pharmacokinetics and pharmacodynamics. The course is designed to provide the foundational knowledge requisite to understanding pharmacotherapeutics.
3.00, Classroom | Web Component

NSG-532 Advanced Physiology

This course covers selected aspects across the lifespan of advanced cell biology and systems physiology that are related to cellular homeostasis and viability in humans.
3.00, Classroom | Web Component

NSG-533 Advanced Pathophysiology

This course incorporates scientific concepts, principles, and theories into discussion of advanced pathophysiologic processes across the lifespan. Pathophysiology is a combined science that encompasses definition/classification, epidemiology, risk factors, etiology, pathogenesis, and clinical manifestations. The initial sections of the course cover basic mechanisms of disease which are then integrated into subsequent discussions of selected

system-related disorders. Learning activities and evaluation strategies are focused on the development and assessment of critical thinking and problem-solving in clinical scenarios to facilitate real-world practice applications and prepare students for certification exams.

3.00, Online Only

NSG-534 Major Psychopathological Disorders

This course will focus on the epidemiology, etiology, clinical manifestation and treatment of selected psychopathologic disorders across the lifespan. Emphasis will be placed on assessment and interventions in a variety of settings. This emphasis will also include the impact of culture on diagnosis and treatment of selected disorders and a critical evaluation of relevant research findings.

3.00, Online Only

NSG-535 Diagnostics for the APRN

This course prepares the advanced practice nursing student to use, interpret, and implement laboratory and diagnostic testing in the clinical setting for the use, interpretation, and application of laboratory, diagnostic techniques and procedures. With this information, the student will learn to use critical thinking and decision making skills to interpret laboratory and diagnostic testing results across the lifespan.

3.00, Classroom | Web Component

NSG-536 Principles of Case Management for Advanced Nursing Practice

This course is designed to provide an overview of the evolution and core principles of case management. Contemporary case management models across the health care continuum will be analyzed. Case management competencies for advanced nursing practice will be addressed. A major focus is to identify strategies that promote appropriate clinical outcomes of care, coordination of care, and cost-efficient utilization of resources using a systems perspective.

3.00, Online Only

NSG-537 Transition to the APRN Role

This course addresses issues relevant to APRN practice. It focuses on models of APRN practice, ethical principles, regulation, quality outcomes, reimbursement, and professional issues related to an APRN entering a first position in the current marketplace.

3.00, Online Only

NSG-541 Chemistry & Physics in Anesthesia

Students will learn to apply the basic principles of chemistry and physics in nurse anesthesia practice, and will review medical math. The components of an anesthesia machine will

be analyzed and currently available monitoring devices will be reviewed and compared.

3.00, Classroom | Web Component

NSG-542 NRS Anesthesia Pharmacology

This course provides a comprehensive study of the pharmacokinetics and pharmacodynamics of drugs used in nurse anesthesia practice. The interactions between anesthetic agents and other pharmacological substances will be discussed. Learners will review the effects of the aging process and its altered physiology on anesthesia pharmacology. Prerequisite: Advanced Pharmacology

3.00, Classroom | Web Component

NSG-543A Anesthesia Principles I: Basic Principles

A solid foundation of basic knowledge is vital to nurse anesthesia practice. This course provides a comprehensive orientation to nurse anesthesia practice, facilitating incorporation of safe, basic, principles into the delivery of competent, responsible patient care. In the co-requisite practicum course, there will be experiences that will allow the students to begin to develop the general clinical skills in the practice of anesthesia that will serve as the basis for subsequent progression to a more advanced nurse anesthesia practice. LT grade

3.00, Classroom

NSG-543B Anesthesia Principles II: Advanced Principles

This course is for the student who has a foundation in the basic principles & practice of nurse anesthesia. During this course, students learn anesthetic management principles for surgical specialty areas. Important concepts to master include the related anatomic, physiologic, pathophysiologic & pharmacologic principles for each of the surgical specialty areas. LT grade

3.00, Classroom | Web Component

NSG-543C Anesthesia Principles III Obstetric & Pediatrics

This course provided essential content for nurse anesthesia care in the specialty areas of obstetric & pediatric anesthesia. Learners will acquire knowledge related to the preoperative assessment of obstetric & pediatric patients, as well as the planning, implementation & evaluation of nurse anesthesia care provided to obstetric & pediatric patients undergoing diagnostic & surgical procedures. LT grade

3.00, Classroom | Web Component

NSG-546 Developmental Physiology Fetus/Neonates

This course is designed to provide the student with greater depth of understanding of developmental physiology of the fetus and neonate. Principles of growth and development, genetics/teratogenesis, embryology, and maturation of organ

systems as related to critical periods of intrauterine development, transition to extrauterine life, and through early infancy will be covered. Adaptation to physiologic stress and alterations from normal will also be discussed.

3.00, Online Only

NSG-547 Neonatal Pathophysiology

This course provides a graduate level conceptual approach to principles and content in neonatal pathophysiology which form the scientific foundation for the development, implementation, and evaluation of clinical therapeutics. It is designed to provide the advanced practice nursing student with an in depth analysis of advanced neonatal pathophysiology. General and system specific concepts related to causation and clinical presentation of selected pathophysiologic states will be discussed. Prototype diseases are used to illustrate pathophysiologic concepts and assist the student in applying these concepts systematically.

3.00, Online Only

NSG-548 Advanced Neonatal Physical Assessment

This course is designed to develop the student's knowledge of comprehensive physical assessment and the diagnosis of physical findings in the premature and term neonate. The central objective of the course is to emphasize the importance of critical reasoning and clinical decision making based on a thorough collection of history and physical findings, accurate documentation and their systematic analysis. The course content is organized around assessment of specific body systems of the neonate. The neonate's presentation at birth is emphasized.

3.00, Online Only

NSG-549 Neonatal Pharmacotherapeutics

This course is designed to provide advanced practice nursing students with a working knowledge of the impact of neonatal physiology on drug pharmacology. Building on the student's knowledge of pharmacokinetics and pharmacodynamics, content includes the role and responsibilities of the APN in prescribing medications, considerations in medication selection for the treatment of a variety of neonatal conditions, diseases and disorders, as well as monitoring the physiological responses to such interventions. Also addressed are the effects of drugs during pregnancy and lactation on the fetus and neonate

Prerequisite: Advanced Pharmacology

3.00, Online Only

NSG-550A Neonatal Management I

This is the first of three sequential management courses that provide the theoretical and practical knowledge for the neonatal nurse practitioner to manage the health care needs of the neonate at the highest level of nursing practice. Course content focuses on the recognition and management of common

conditions affecting the newborn. Demonstrating critical thinking and diagnostic reasoning skills in clinical decision making, developing a plan of care based on scientific evidence and practice guidelines, and instituting evidence-based strategies to provide psychosocial support and education for the infant's family are emphasized.

3.00, Online Only

NSG-550B Neonatal Management II

This is the second of three sequential management courses that provide the theoretical and practical knowledge for the neonatal nurse practitioner to manage the health care needs of the neonate at the highest level of nursing practice. Course content focuses on the recognition and management of acute conditions affecting the neonate/preterm infant. Demonstrating critical thinking and diagnostic reasoning skills in clinical decision making, developing a plan of care based on scientific evidence and practice guidelines, and instituting evidence-based strategies to provide psychosocial support and education for the infant's family are emphasized.

3.00, Online Only

NSG-550C Neonatal Management III

This is the final of three sequential management courses that provide the theoretical and practical knowledge for the neonatal nurse practitioner to manage the health care needs of the neonate at the highest level of nursing practice. Course content focuses on the recognition and management of life-threatening conditions affecting the neonate/preterm infant. Demonstrating critical thinking and diagnostic reasoning skills in clinical decision making, developing a plan of care based on scientific evidence and practice guidelines, and instituting evidence-based strategies to provide psychosocial support and education for the infant's family are emphasized.

3.00, Online Only

NSG-551A Advanced Primary Care of the Child I

The course focus is on the development of pediatric clinical judgment. A chronological approach is used to address preventative health care services and identification and management of common health problems in infants, children, and adolescents.

3.00, Online Only

NSG-551B Advanced Primary Care of the Child II

The course content provides the theoretical basis for clinical judgment and decision making skills for providing primary care to ill children and their families. A systems approach is used to focus on assessment and management of acute and common health problems. This is the second course in the three course series in the PNP management sequence

3.00, Online Only

NSG-551C Advanced Primary Care of the Child III

The course enhances clinical judgment and decision making skills required in providing primary care to children with complex physical and psychosocial needs due infectious disease, genetics and environmental conditions. A systems approach is used to focus on assessment and management of complex health problems. This is the third class in a three part series.

3.00, Classroom | Online Only

NSG-556 Applied Pharmacology: Pediatrics

In this course, pediatric advanced practice students apply a systematic process for therapeutic prescription plans for selected common acute and chronic health conditions.

3.00, Online Only

NSG-557A Pediatric Acute Care I

The course content provides the theoretical basis for clinical judgment, decision-making, and procedural skills for delivering complex acute, critical, and chronic health care to ill or injured children and their families. Recognition and management of emerging health crises and organ dysfunction by systems are emphasized. Part 1 of a 2 part series.

3.00, Classroom | Web Component

NSG-557B Pediatric Acute Care II

The course content provides the theoretical basis for clinical judgment, decision-making, and procedural skills for delivering complex acute, critical, and chronic health care to ill or injured children and their families. Recognition and management of the injured child and transitions in care are emphasized. This is part 2 of a 2 part series.

3.00, Classroom | Web Component

NSG-565 Public Health Systems & the APHN Role

Students will examine ethical, economic, financial and role issues relevant to community and public health care. The focus will be on helping students gain knowledge, tools, and experience to understand community-based and public health care organizations, their roles and functions within the US Health Care System, and the advanced nursing role in these organizations. Prerequisite: Healthcare Economics, Policy, Finance; Leadership in Evolving Healthcare Environments; Applied Epidemiology and Biostatistics for Nursing Practice; Corequisite: 1-3 credit hr NSG 606

3.00, Online Only

NSG-566 Population Assessment & Health Promotion Frameworks

This is the first of two sequential courses in population assessment and intervention planning. The course focuses on an

application of the concepts and methods for conducting an in depth assessment of health status among populations, which serves as the foundation for the health planning process.

Principles of epidemiology and assessment frameworks are applied in analyzing population and organizational level data to provide understanding of population needs and resources. Students examine health promotion frameworks in relation to effective approaches to guiding population level interventions. Prerequisite: Applied Epidemiology and Biostatistics, Research for Evidence Based Practice; Prerequisite or corequisite for APHN and Pop Health MSN-DNP students: Public Health Systems & APHN Role, Specialty Practicum 3 credit hours

3.00, Online (75% or Greater)

NSG-567 Population Intervention Planning, Implementation & Evaluation

This is the second of two sequential courses in population* health assessment and program/intervention planning. The course is organized around planning as a method of decision-making. Various theoretical frameworks are applied to the development of a plan to meet the health needs of selected populations at-risk, based on an in-depth population assessment. Formulation of implementation strategies and evaluation schemes for sustainable program/intervention development are discussed. Emphasis is on implementation and evaluation methods for innovative nursing practice with communities/populations. *For the purposes of this course, the term population is defined to include the traditional public health population and clinical populations/aggregates.

3.00, Classroom | Web Component

NSG-568 Environmental Health

This course provides an overview of the core principles in environmental health. Emphasis is on application of basic concepts to address specific environmental hazards that affect the health of individuals and populations.

3.00, Online Only

NSG-569 Maternal Child Management for FNP

This course addresses the diagnosis and management of 1) common acute and chronic health care problems in children from infancy through adolescence and 2) pregnancy and fertility issues for women of child-bearing age. Prevention, screening, diagnosis, treatment, and counseling of these patients and their families form the framework for students to refine evidence-based clinical decision-making and reasoning skills. Quality, cost-effectiveness and safety are integrated in the development of patient-centered management plans.

3.00, Classroom | Web Component

NSG-570A Pharmacotherapeutics Acute Care

Course provides the advanced practice nurse with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan according to specialty area of practice. Building on the student's knowledge of pharmacokinetics and pharmacodynamics, content includes medications used for the diagnosis and treatment of a variety of physical and psychiatric disorders and monitoring the physical, behavioral and psychiatric responses to such interventions. The course is offered in sections according to specialty area of practice.
3.00, Classroom | Web Component

NSG-570B Pharmacotherapeutics Primary Care

Course provides the advanced practice nurse with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan according to specialty area of practice. Building on the student's knowledge of pharmacokinetics and pharmacodynamics, content includes medications used for the diagnosis and treatment of a variety of physical and psychiatric disorders and monitoring the physical, behavioral and psychiatric responses to such interventions. The course is offered in sections according to specialty area of practice.
3.00, Classroom | Web Component

NSG-571A Management: Adult/Gerontology I

This course addresses the diagnosis and management of selected common acute and chronic health care problems in the late adolescent through older adult populations. Prevention, screening, diagnosis, treatment, and counseling adult patients form the framework for students to refine evidenced-based clinical decision-making and reasoning skills. Quality, cost-effectiveness and safety are integrated in the development of patient-centered management plans. The major focus of this course is: cardiovascular, pulmonary, endocrine, women's health problems and gerontological considerations.
3.00, Classroom | Web Component

NSG-571B Management: Adult/Gerontology II

This course addresses the diagnosis and management of selected common acute and chronic health care problems in the late adolescent through older adult populations. Prevention, screening, diagnosis, treatment, and counseling adult patients form the framework for students to refine evidenced-based clinical decision-making and reasoning skills. Quality, cost-effectiveness and safety are integrated in the development of patient-centered management plans. The focus of this course is: neurological, sensory, musculoskeletal, dermatological, psychiatric, oncological, women's health problems, and gerontological considerations.
3.00, Online Only

NSG-571C Management: Adult/Gerontology: Acute & Critical Illness I

This course addresses the diagnosis and management of selected acute, chronic, and critical health care problems in the late adolescent (16 years) through older adult populations. Prevention, screening, diagnosis, treatment, and counseling adult patients form the framework for students to refine evidence-based clinical decision-making and reasoning skills. Quality, cost-effectiveness and safety are integrated in the development of patient-centered management plans.
4.00, Classroom | Web Component

NSG-571D Management: Adult/Gerontology: Acute & Critical Illness II

This is the third clinical management course that focuses on the advanced management of the critically ill adult patient. This course addresses the synthesis of critical illness management.
2.00, Classroom | Web Component

NSG-572 Quality & Safety for the Aging Adult

This course prepares nurse leaders to create a culture of quality improvement and patient safety for the aging adult. Current models of quality & patient safety are evaluated in the context of national trends & healthcare priorities. The essential role of interprofessional teams as a mechanism to improve quality & patient safety is addressed. LT
3.00, Online Only

NSG-573 Aging Adult: Care & Concepts

This course focuses on developing an understanding of aging issues and using a holistic approach to managing the complex needs of older adults. Demographics, policies, and issues that impact aging adults across the continuum of care are addressed. Evidence-based guidelines are used as the basis for care and management of aging adults.
3.00, Online Only

NSG-575 Psychopharmacology

This course is designed to provide advanced practice nursing students with knowledge of pharmacotherapeutics for common acute and chronic health conditions across the lifespan. It will also prepare PHMNP students to use, interpret and apply appropriate laboratory diagnostic procedures to the use of medications to treat a variety of psychological and psychiatric disorders. Building on the student's knowledge of pharmacokinetics and pharmacotherapeutics, content includes medications used for the diagnosis and treatment of a variety of psychological and psychiatric disorders and monitoring the physiological, psychiatric and behavioral responses to these interventions
3.00, Online Only

NSG-576 Neuropathophysiology: Lifespan Approach

This course is designed to provide advanced practice nursing students with knowledge of the essential neuropathophysiology of mental illness, across the lifespan. Building on the basics of cell physiology and neural transmission, this course focuses on the neurobiology of select serious mental illnesses. There is emphasis throughout on the neural structures and functions thought to be implicated in symptom presentation and disease progression of select serious mental illnesses.

3.00, Online Only

NSG-577A Diagnostics & Management I: Psychiatric Assessment Across Lifespan

This course will focus on the methods for gathering pertinent data in order to conduct a psychiatric assessment, arrive at a differential diagnosis and make appropriate treatment recommendations with clients across the life span demonstrating psychiatric symptoms.

3.00, Online Only

NSG-577B Diagnostics & Management II: Evidence Based Treatment

The theoretical basis for psychotherapeutic nursing interventions across the lifespan is examined. Cognitive treatment and evidence based therapy techniques receive particular emphasis. Management of common psychiatric disorders via clinical practice guidelines is a third course thread.

3.00, Online Only

NSG-577C Diagnostics & Management III: Group Therapy and Complex Care

This course has three foci: in depth analysis of theory and research as a basis for the clinical practice of group psychotherapy; exploration of the mental health recovery paradigm, and finally, the assessment, planning and intervention in complex care of individuals with co-morbid substance use and medical conditions

3.00, Online Only

NSG-578 Interprofessional Cultural Competency Via Community Based Service

This interprofessional course is designed to provide students across the disciplines with the knowledge and skills to provide care within diverse populations and communities. Students will examine personal attitudes and beliefs as they relate to cultural competency and will develop and implement a service learning project in conjunction with and the needs of the community setting in which they are placed; they will reflect on their experiences as they examine their personal beliefs, values, and views, as well as their experiences interacting with each other and their community partners. LT

3.00, Online Only

NSG-600 Leadership in Evolving Healthcare Environments

This course guides students in explorations of leadership in evolving healthcare environments. Students complete an assessment and analysis of their leadership style. Leadership trends, styles, and competencies are applied to specific leadership scenarios and challenges. In addition, students develop a leadership e-portfolio including a vision statement, goals, and specific strategies for attaining these goals.

3.00, Online Only

NSG-602 Healthcare Economics, Policy, Finance

This course will examine current trends in healthcare policy and economics and their impact on financing and care delivery in the US. Using informatics as a tool, costs associated with specific health care delivery systems will be analyzed at the organizational level

3.00, Online Only

NSG-603 Effective Project Planning: Implementation and Evaluation

This course provides students with the information and tools needed to strategically plan, implement and evaluate change initiatives and outcomes in practice and health care environments.

3.00, Online Only

NSG-604A DNP Project Planning I

This course is the first of three consecutive one hour seminars. Each seminar focuses on a specific aspect of planning for implementation and evaluation related to a significant project that impacts at least one of the Institute of Medicine's six aims: health care safety, effectiveness, patient-centeredness, timeliness, efficiency, or equity. The focus of this course is on the project problem statement, review of related literature, and application of a planning model. Students are guided by their DNP project advisor in the development of their project/capstone proposal and in the integration of core content obtained throughout the DNP program. Upon completion of this series of seminars, the student will have developed and received the required approvals on a project proposal and submitted necessary Institutional Review Board requirements.

1.00, Online Only

NSG-604B DNP Project Planning II

This course is the second of three consecutive one hour seminars. Each seminar focuses on a specific aspect of planning for implementation and evaluation related to a significant project that impacts at least one of the Institute of Medicine's six aims: health care safety, effectiveness, patient-centeredness, timeliness, efficiency, or equity. The focus of this course is on the project evaluation and resource needs. Students are guided by their

DNP project advisor in the development of their project/capstone proposal and in the integration of core content obtained throughout the DNP program. Upon completion of this series of seminars, the student will have developed and received the required approvals on a project proposal and submitted necessary Institutional Review Board requirements.

1.00, Online Only

NSG-604C DNP Project Planning III

This course is the third of three consecutive one hour seminars. Each seminar focuses on a specific aspect of planning for implementation and evaluation related to a significant project that impacts at least one of the Institute of Medicine's six aims: health care safety, effectiveness, patient-centeredness, timeliness, efficiency, or equity. Students are guided by their DNP project advisor in the development of their project/capstone proposal and in the integration of core content obtained throughout the DNP program. Upon completion of this course, the student will have developed and received the required approvals on a project proposal and submitted necessary Institutional Review Board requirements.

1.00, Online Only

NSG-604D DNP Project Planning II & III

The seminar focuses on specific aspects of planning for implementation & evaluation related to a significant project that impacts at least one of the Institute of Medicine's six aims: health care safety, effectiveness, patient-centeredness, timeliness, efficiency, or equity. Students are guided by their DNP project advisor in the development of their project proposal and in the integration of core content obtained throughout the DNP program. Upon completion of this course, the students will understand project evaluation and resource needs and will have developed and received the required approvals on a project proposal and submitted necessary Institutional Review Board requirements. PF grade

2.00, Classroom | Online Only

NSG-605 DNP Capstone

The DNP Capstone Project provides students with a faculty guided experience in the application of advanced clinical practice and systems level knowledge and skill in a practice setting. The capstone experience is directed at the completion of a significant project that impacts at least one of the Institute of Medicine's six aims: health care safety, effectiveness, patient-centeredness, timeliness, efficiency or equity. The project represents a synthesis of knowledge gained in all previous coursework and involves development, implementation, and evaluation of a process for change in health care delivery for individuals, groups, or populations. The project should be of

such a nature that it serves as a foundation for future scholarship. The student's chosen program of study will inform the level of practice change for the project. This course is taken during the term students intend to do their public presentation.

3.00, Classroom | Web Component

NSG-605 DNP Capstone

The DNP Capstone Project provides students with a faculty guided experience in the application of advanced clinical practice and systems level knowledge and skill in a practice setting. The capstone experience is directed at the completion of a significant project that impacts at least one of the Institute of Medicine's six aims: health care safety, effectiveness, patient-centeredness, timeliness, efficiency or equity. The project represents a synthesis of knowledge gained in all previous coursework and involves development, implementation, and evaluation of a process for change in health care delivery for individuals, groups, or populations. The project should be of such a nature that it serves as a foundation for future scholarship. The student's chosen program of study will inform the level of practice change for the project. This course is taken during the term students intend to do their public presentation.

2.00, Classroom | Web Component

NSG-606 DNP/Specialty Practicum

Practica are planned conjointly by the student and faculty member. The minimum number of hours of practica may be determined by the specialty specific credentialing body and DNP requirements and may vary across specialty programs. Clinical conference is included. Prerequisite or corequisite: Core courses as determined by each program. RN licensure as required by the state in which the practicum will be conducted in. Post-graduate student requirements are individually determined. P/N grading.

1.00-12.00, Practicum | Online Only

NSG-607 DNP/Specialty Immersion Residency

This course is designed to provide advanced nursing practice students with an opportunity to achieve specialty competence at the DNP level. The experience is accomplished under the guidance of an approved preceptor/facilitator. The minimum number of clock hours of residency may be determined by the specialty specific credentialing body and DNP requirements and may vary across specialty programs.

1.00-14.00, Online Only

NSG-611 Financial & Business Concepts

This course will enable students to understand, apply, and communicate the concepts required for effective financial planning, decision making, and management in healthcare programs

and organizations. The long-term financial impact of practice changes will be assessed at the organizational level.

3.00, Online Only

NSG-612 Applied Organizational Analysis & Management of Human Resources

This course focuses on the structure and function of organizations. The elements of organizational features, culture, and human talent and the influence on outcomes are explored.

3.00, Online Only

NSG-613 Data and Decision Making for Strategic Outcomes Management

This course focuses on acquiring and demonstrating the skills to effectively utilize data for health care decision making based on the process of outcomes management. Students will acquire and demonstrate the skills to effectively utilize data to change health care environments, to formulate an outcomes management plan, and to evaluate aspects of the outcomes management process.

3.00, Online Only

NSG-614 The Leader and Policy, Politics, Power, & Ethics

This course will prepare nursing leaders to analyze and influence health policy environments. The student will learn to apply methods of policy analysis to policies of relevance to their practice settings, and to use the results to advocate for populations and organizations/systems. The student will learn methods for evaluating policy outcomes and how to design interventions to influence policy making and intervention implementation. Applying these skills in an organizational context will enhance the policy process, as well as help leaders to assist their organizations to respond to policy opportunities and threats.

3.00, Online Only

NSG-625 Advanced Health Assessment-APRN Across Lifespan

This course is designed to enhance the advanced practice nursing student's knowledge of a history and physical examination and the diagnosis of physical findings of individuals across the lifespan. The course introduces the student to clinical problem solving through a series of lectures, case presentations, and class discussion. This course emphasizes the importance of the careful collection of data by history and physical examination and their systematic analysis. The content of the course is organized around the health assessment of specific body systems and provides a framework of critical thinking and development of differential diagnosis.

2.00, Online Only

NSG-625L Health Assessment Across the Lifespan Lab: Specialty

This course is designed to teach the clinical components of a comprehensive history and physical examination of individuals/families across the lifespan and the documentation of findings. The course provides a framework of critical thinking based on careful collection of history and physical findings and their systematic analysis. The course content is organized around advanced health assessment of specific body systems of individuals/families across the lifespan.

1.00, Classroom | Online (75% or Greater)

NSG-625L Advanced Health Assessment-APRN: Lab

In this course, students will develop skills needed to conduct a comprehensive history and physical examination of individuals across the lifespan and document the findings. The course provides a framework of critical thinking based on careful collection of history and physical findings and their systematic analysis. The course content is organized around advanced health assessment of specific body systems of individuals across the lifespan.

1.00, Classroom | Online (75% or Greater)

NSG-675 Literature Synthesis Approach

This doctoral-level course examines aspects pertinent to synthesizing the literature in the form of integrative and systematic literature reviews. Content emphasizes the principles of a literature review, including the review question, review protocol, search strategies, data extraction, and synthesis.

3.00, Online Only

NSG-678 The Research Process: Mixed Methods Design

This web-based course will focus on the history, nomenclature, typologies, design, conduct, and dissemination of mixed methods research. Emphasis will be on the comparison of various mixed method typologies, the selection of appropriate design for the research questions, and the integration of both the qualitative and quantitative data in analysis, and dissemination of results. Prerequisite: The Research Process: Qualitative Design; The Research Process: Quantitative Design Methods Part I and Part II (Corequisite is acceptable)

3.00, Online Only

NSG-679 Academic Scholarship in Nursing

This web-based course addresses crucial aspects of nursing education that graduates will need to function as leaders in academia. The National League for Nursing Core Competencies of Nursing Education provides the foundation for course content. Students will enroll for 1 or 4 credit hours based on individual learning needs.

1.00-4.00, Online Only

NSG-680 Understanding Scientific Paradigms

This course will provide students with a foundation in relevant philosophies of science that have influenced knowledge development and scientific inquiry in nursing. The learner will examine how philosophies of science have influenced the development of knowledge and will analyze a concept embedded within a particular context or phenomenon of interest.

3.00, Online Only

NSG-681 Understanding Theoretical Framework Development

This course provides the learners with the opportunity to develop or expand a theoretical framework that will guide their Advanced Clinical Research Practicum (ACRP) and their dissertation research. Integration of the literature is emphasized.

3.00, Online Only

NSG-682 Developing Professional Writing Skills

This course assists students to develop their publication knowledge and skills. Issues related to the publication process will be explored. Emphasis is on health science writing and publication in professional journals.

3.00, Online Only

NSG-683 Ethical Conduct-Research Setting

This course provides the student with an in-depth examination of the ethical principles that guide the conduct of responsible research. These principles will be examined in the context of current, historical, and future scientific achievements.

3.00, Online Only

NSG-684 Intermediate Statistics

This course develops student's knowledge of the application of database management principles and intermediate statistical principles in health care research.

3.00, Online Only

NSG-685 Multivariate Statistics

This course develops student's knowledge of the application of multivariate statistical principles in health care research. LT

3.00, Online Only

NSG-686 The Research Process: Quantitative Design & Methods Part I

This course is the first in a series of three doctoral level research courses that promote the development, integration, and application of the knowledge, attitudes, and skills required to function as a clinical nurse scientist. This course provides an overview of the research process and a brief history of nursing research within the context of current issues and trends in nursing.

The research literature serves as the foundation for examining research problems, developing problem statements, and conceptualizing research questions. Finally, theoretical and conceptual frameworks ground and enrich the research process as students explore appropriate samples and sampling designs.

3.00, Online Only

NSG-687 Research Process: Design/Method II

This course is the second in a series of three doctoral level research courses that promote the development, integration, and application of the knowledge, attitudes, and skills required to function as an independent clinical researcher. The course will include research design, measurement, instrument development, intervention fidelity, data management, cross-cultural issues, and research translation. Emphasis is on the critical appraisal of selected research designs and measurement strategies relevant to quantitative research.

3.00, Online Only

NSG-688 The Research Process: Qualitative Design & Methods

This course will focus on the design, conduct, and dissemination of qualitative research. Emphasis will be on the critical appraisal of qualitative research methodologies, data analysis, and analysis and interpretation of findings.

3.00, Online Only

NSG-689 Leadership Seminar

In this course students will integrate principles of effective nursing leadership and leadership plan development. Students will examine core leadership competencies and begin to develop, implement, and evaluate their leadership development e-portfolios. In addition, students will apply leadership competencies to current healthcare challenges.

3.00, Online Only

NSG-690 Grantsmanship

This course examines grant writing and review skills. Content focuses on grant mechanisms, strategies, format, and the review process. Guidelines address writing particular NIH grant sections including: specific aims and research approach, human subjects, budget, personnel, and supporting materials.

3.00, Classroom | Online Only

NSG-691 ACRP

Encompasses a minimum of 12 credit hours of individually designed courses of independent study that are planned conjointly by the student and academic advisor.

1.00-12.00, Online Only

NSG-699 Dissertation Research

The student contracts with faculty members and the Associate Dean for Academic Affairs for independent research. The doctoral candidate must be enrolled for at least three quarter hours each quarter or until the dissertation has been defended. The successful dissertation defense constitutes a submitted paper and verbal defense.

5.00, Online Only

NSG-699 Dissertation Research

The student contracts with faculty members and the Associate Dean for Academic Affairs for independent research. The doctoral candidate must be enrolled for at least three quarter hours each quarter or until the dissertation has been defended. The successful dissertation defense constitutes a submitted paper and verbal defense.

6.00, Online Only

NSG-699 Dissertation Research

The student contracts with faculty members and the Associate Dean for Academic Affairs for independent research. The doctoral candidate must be enrolled for at least three quarter hours each quarter or until the dissertation has been defended. The successful dissertation defense constitutes a submitted paper and verbal defense.

3.00-4.00, Online Only

NSG-900A Independent Study

Student contracts with faculty member to complete an academic independent study in a selected area of nursing content.

1.00-9.00, Independent Study | Web Component

NSG-900B Independent Clinical Study

Intensive independent study in a specialty clinical area of nursing with faculty contract. RN Licensure and admission to the College of Nursing

1.00-9.00, Clinical

NSG-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

NTR-503 Management in Dietetics

An examination of management strategies and techniques used in delivery of food and nutrition services in a health care setting.

2.00, Classroom

NTR-503 Leadership in Dietetics

Theories of leadership will be examined. Discussion will focus on practices and principles related to developing leadership skills.

2.00, Classroom | Web Component

NTR-505 Advanced Medical Nutrition Therapy I

Technical, conceptual and behavioral aspects of dietary prevention and treatment of disease states are presented. Students apply principles of medical nutrition therapy to various disease states.

2.00, Online Only

NTR-506 Advanced Medical Nutrition Therapy II

Technical, conceptual and behavioral aspects of dietary prevention and treatment of disease states are presented. Students apply principles of medical nutrition therapy to various disease states.

3.00, Online Only

NTR-511 Supervised Experience in Food Systems Management I

Students function as members of the management team in the food service units of the medical center. Through increasingly complex learning experiences, students are expected to develop competence as an entry-level practitioner in food service management. Limited to clinical nutrition students. P/N grading.

5.00, Classroom

NTR-511 Supervised Experience in Food Systems Management I

Students function as members of the management team in the food service units of the medical center. Through increasingly complex learning experiences, students are expected to develop competence as an entry-level practitioner in food service management. Limited to clinical nutrition students. P/N grading.

3.00, Classroom

NTR-512 Supervised Experience in Food Systems Management II

Students function as members of the management team in the foodservice units of the medical center. Through increasingly complex learning experiences, students are expected to develop competence as an entry-level practitioner in food service management. Limited to clinical nutrition students. P/N grading.

1.00, Classroom | Web Component

NTR-512 Supervised Experience in Food Systems Management II

Students function as members of the management team in the foodservice units of the medical center. Through increasingly complex learning experiences, students are expected to develop competence as an entry-level practitioner in food service management. Limited to clinical nutrition students. P/N grading. 2.00, Classroom | Web Component

NTR-513 Supervised Experience in Clinical Nutrition I

Students will plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students will function as members of the health care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 2.00, Clinical

NTR-514 Supervised Experience in Clinical Nutrition II

Students will plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students will function as members of the health care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 4.00, Classroom | Clinical | Web Component

NTR-515 Supervised Experience in Clinical Nutrition III

Students will plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students will function as members of the health care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 4.00, Classroom | Clinical

NTR-516 Supervised Experience in Clinical Nutrition IV

Students will plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students will function as members of the health care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 5.00, Clinical

NTR-516 Supervised Experience in Clinical Nutrition IV

Students plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students function as members of the health

care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 6.00, Clinical

NTR-517 Supervised Experience Clinical Nutrition V

Students will plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students will function as members of the health care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 3.00, Clinical

NTR-517 Supervised Experience Clinical Nutrition V

Students will plan, organize, direct and evaluate nutrition care for individuals and groups of varying ages and lifestyles, across the continuum of care. Students will function as members of the health care team with increasingly complex learning experiences and clinical responsibilities. Limited to clinical nutrition students. P/N grading. 6.00, Clinical

NTR-518 Supervised Experience in Management

Students function as members of the management team in the foodservice and nutrition department of the medical center. Students will complete a management project. 2.00, Clinical

NTR-518 Supervised Experience in Management

Students function as members of the management team in the foodservice and nutrition department of the medical center. Students complete a management project. 3.00, Clinical

NTR-521 Human Metabolism I

Digestion, absorption and transport of food components, energy regulation, and energy requirements are emphasized. 4.00, Classroom | Web Component

NTR-521 Regulation of Macronutrient Metabolism In Human Nutrition

Nutrition In advance course in human metabolism, students integrate biochemical and molecular nutrition, emphasizing regulation of dietary carbohydrates, lipid, and protein metabolism and their impact on nutritional status and health. Differences in fuel utilization in specific organs under various conditions are highlighted. 4.00, Classroom | Web Component

NTR-522 Human Metabolism II

Protein metabolism and an overview of vitamins and inorganic nutrients are emphasized. Prerequisite: NTR 521.

4.00, Classroom | Web Component

NTR-522 Energy Metabolism and Bioactive Ingredients in Human Nutrition

This advanced course in human metabolism integrates biochemical and molecular nutrition as it relates to the regulation of energy metabolism. Health impact of dietary supplements and phytochemicals as new bioactive molecules of interest in human health will also be covered.

2.00, Classroom | Web Component

NTR-523 Advances in Vitamin and Mineral Nutriture in Human Nutrition

This advanced course in human metabolism looks at key metabolic pathways and physiological factors affecting micronutrient needs at various life stages.

2.00, Classroom | Web Component

NTR-531 Applied Behavioral Change/Educational Theories in Nutrition Counseling and Education

Students will plan, implement and evaluate a nutrition counseling project around specific dietary behavior and behavior change theory and strategies. Students will share results of experience and project with clinicians.

4.00, Classroom | Web Component

NTR-534 Nutrition in Critical Care

An advanced level supervised experience in enteral and parenteral nutrition. Current rationale and techniques for implementing and monitoring nutritional therapy in critically ill patients will be explored. Special attention is given to metabolic complications associated with enteral and parenteral feeding.

Prerequisite: NTR 543, 516.

1.00-3.00, Classroom

NTR-535 Nutrition in Pediatric Critical Care

Supervised practicum based on scientific theory and practical application of nutrition support in critically ill infants/children. Studies include: nutritional requirements of premature infants; nutrition delivery in neonatal intensive care unit; enteral and parenteral nutrition therapies for pediatric patients with a variety of diseases and organ dysfunctions. Prerequisite: NTR 534.

1.00, Classroom

NTR-541 Interrelationship of Nutrition and Disease I

Pathophysiology of disease and the interrelated role of nutrition in etiology and treatment of disease are emphasized in this series.

2.00, Classroom | Web Component

NTR-541 Integrating Nutrition in Disease Prevention and Treatment I

Pathophysiology of disease and the interrelated role of nutrition in prevention, etiology, and treatment of disease are emphasized in this series. Critical review of the nutrition literature in prevention and treatment of acute and chronic disease.

4.00, Classroom | Web Component

NTR-542 Interrelationship of Nutrition and Disease II

Pathophysiology of disease and the interrelated role of nutrition in etiology and treatment of disease are emphasized in this series.

4.00, Classroom | Web Component

NTR-542 Integrating Nutrition in Disease Prevention and Treatment II

Pathophysiology of disease and the interrelated role of nutrition in prevention, etiology, and treatment of disease are emphasized in this series. Critical review of the nutrition literature in prevention and treatment of acute and chronic disease.

4.00, Classroom | Web Component

NTR-543 Interrelationship of Nutrition and Disease III

Pathophysiology of disease and the interrelated role of nutrition in etiology and treatment of disease are emphasized in this series.

2.00, Classroom | Web Component

NTR-544 Interrelationship of Nutrition and Disease IV

Pathophysiology of disease and the interrelated role of nutrition in etiology and treatment of disease are emphasized in this series.

2.00, Classroom | Web Component

NTR-545 Nutrition Assessment

Interpretation of information from dietary, laboratory, anthropometrics and clinical study. Various nutrition assessment techniques and the appropriate use of these tools in determining the nutrition status of a population and/or individual client.

2.00, Classroom | Web Component

NTR-549 Physiological Basis of Exercise and Nutrition

An examination of the physiological and metabolic adaptations to exercise and physical conditioning. Special attention is given to the nutritional needs of the human body in response to specific types of exercise. Prerequisite: NTR 522, 542

2.00-3.00, Classroom

NTR-555 Nutrition Epidemiology

This course exposes students to cross-sectional studies, longitudinal studies, and clinical trials that focus on nutritional outcomes and dietary patterns in relation to health outcomes of

population groups. A major emphasis is placed on findings from major national surveys or trials, in particular, NHANES, Diabetes Prevention Program, PREMIER and Women's Health Initiative and how these findings have influenced nutrition policy, research and funding directions

3.00, Classroom | Web Component

NTR-555 Population Studies in Nutrition Epidemiology

Cross-sectional studies, longitudinal studies, and clinical trials that focus on nutritional outcomes, and dietary patterns in relation to health outcomes of population groups. A major emphasis is placed on the findings garnered from major national surveys or trials. Some discussion on how findings have influenced nutrition policy, research and future prevention strategies.

2.00, Classroom | Web Component

NTR-558 Dietetic Public Policy Initiatives and Advocacy

This course introduces students to the public policy initiatives supported by the American Dietetic Association, reviews the policy formulation process and provides opportunities to advocate for food & nutrition initiatives with elected governing officials. Students will monitor and actively advocate for public policy impacting food and nutrition.

1.00, Classroom

NTR-560 Food & Nutrition Services Management

The course will focus on advanced practices and principles related to management of food and nutrition services in health-care operations.

3.00, Classroom | Web Component

NTR-565 Seminar I

Students and faculty present research topics related to food, nutrition and/or foodservice management

1.00, Classroom

NTR-566 Seminar II

Students and faculty present research topics related to food, nutrition and/or foodservice management

1.00, Classroom

NTR-566 Seminar

This course is designed to allow students to research the literature related to a specific topic, present a summary and critical analysis of the literature supporting/refuting this topic, respond to questions, and lead a discussion among peers and faculty.

1.00, Classroom | Web Component

NTR-572 Nutrition Communication

The course will explore various theoretical perspectives on health-related behavior change and factors that influence

behavior. Selection of strategies and design of interventions for nutrition communication with patients in inpatient and outpatient settings.

3.00, Classroom | Web Component

NTR-582 Introduction to Research

The course will focus on selection of a research problem and identification of designs and methodologies available to address the research problem. In addition, the course is designed to facilitate student interpretation and critical analysis of nutrition research literature.

3.00, Classroom | Web Component

NTR-583 Food Systems Operations Analysis

A study of significant food systems management issues in the healthcare industry.

1.00, Classroom

NTR-586A Thesis I

Under faculty supervision, students will prepare and present a research proposal. Emphasis is on a review of current research literature and appropriate research design and methodology in support of research objectives. Course may be taken across three quarters, one credit each quarter.

2.00, Classroom

NTR-586B Thesis I

Under faculty supervision, students will prepare and present a research proposal. Emphasis is on a review of current research literature and appropriate research design and methodology in support of research objectives. Course may be taken across three quarters, one credit each quarter.

1.00, Classroom

NTR-586C Thesis I

Under faculty supervision, students will prepare and present a research proposal. Emphasis is on a review of current research literature and appropriate research design and methodology in support of research objectives. Course may be taken across three quarters, one credit each quarter.

1.00, Classroom

NTR-587 Thesis II

Students continue the research process. Data collection and initial data analysis will be performed as defined in the research proposal. Pre- or co-requisite: NTR 586C

2.00, Classroom

NTR-588 Thesis III

Students will continue the research process through the completion and interpretation of statistical analyses and oral and written dissemination of the research results and conclusions.

Prerequisite: completion of NTR 586C.
3.00, Classroom

NTR-590 Special Topics

In depth examination of contemporary professional issues. Content varies according to topic choices by instructor.
Prerequisite: Instructor approval.
2.00-3.00, Classroom

NTR-592 Individualized Clinical Practice

For students who wish advanced experience in one or more areas of clinical nutrition practice. Limited to clinical nutrition students.
1.00-2.00, Online Only

NTR-595 Scientific Rationale for Diet Reference Intakes (DRIs)

This course is designed to familiarize the student with scientific rationale for the Dietary Reference intakes. The application of these dietary standards for populations, subgroups, and individuals will be reviewed in both a historical context and one based on current literature.
2.00, Online Only

NTR-598 Thesis

Under faculty supervision, students prepare and present a research proposal. Emphasis is on a review of current research literature and appropriate research design and methodology in support of research objectives.
1.00-5.00, Classroom

NTR-601 Theory & Measurement of Protein And Energy Needs Throughout Lifecycle

Through lecture and group discussion this seminar will review the history of principles associated with assessment of protein and energy needs throughout the lifecycle with an analysis of approaches appropriate for each application. Follow-up discussions will address the controversies surrounding protein needs during aging and certain disease states, i.e., AIDS, diabetes, congestive health failure, etc.
3.00, Classroom

NTR-602 Advanced Principles Nutritional Epidemiology

Through seminar discussion this course is designed to continue the interpretation of epidemiological data regarding nutrition and disease. An exploration of the nature of variation in diet, correction for measurement error, issues in analysis and presentation of dietary data will be conducted. Examination of factor and cluster analyses used to describe dietary patterns of population subgroups will be conducted.
3.00, Classroom

NTR-603 Advanced Vitamin Nutrition

This course provides an in-depth examination of the understanding of vitamins with respect to current dietary reference intakes with an emphasis on critical analyses of the criterion/criteria of adequacy for specific age groups. Additional discussion and evidence will be assessed regarding the basis for tolerable upper limits for each vitamin.
3.00, Classroom

NTR-604 Critical Topics: Clinical Nutrition

This is an independent study in which the student in collaboration with faculty advisor will choose a topic of interest. Focus of course will be on thorough analysis and application of the topic. Project/paper will be defined by student in association with faculty advisor.
3.00, Independent Study

NTR-900 Independent Study

Independent work on a selected topic. Students will complete a literature search and written paper on a topic related to nutrition or food systems management. Arrangements made with advisor prior to registration. Prerequisite: Instructor approval.
1.00-12.00, Classroom

NTR-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
1.00, Continuous Enrollment

NUR-501 Theoretical Perspective/Nursing Science Practice

As nursing evolves as a professional scientific discipline, the delineation of the scientific basis of nursing practice becomes increasingly important. The course provides students with the skills and knowledge to critique and evaluate theories needed to practice as an advanced practice nurse and understand how theory is the basis of research and practice. Selected non-nursing theories/models (e.g., developmental, physiological, health promotion, family, ethical, decision making) are analyzed with emphasis on their application and utility for nursing.
3.00, Online Only

NUR-510 Introduction to Biostatistics

This course is a basic introduction to the use of statistics for nurses in the field of health sciences. Topics include descriptive statistics, hypothesis tests (t-tests, chi-square, one-way analysis of variance and non-parametric tests), and linear regression. Students will be required to do statistical computation on the computer and must have SPSS available. Prerequisite: undergraduate statistics.

3.00-4.00, Classroom | Web Component

NUR-517 Informatics/Health Care Environments

Introduces the student to health care informatics. Functional knowledge of theory and application of nursing informatics to improve patient care and support best practices is emphasized.

2.00, Online Only

NUR-521 Research Evidence-Based Nursing Practice

This course emphasizes identification of specific clinical problems and the critique and synthesis of data sources to improve patient care and outcomes. Content includes accessing databases, critiquing individual and synthesis research studies, and establishing a scientific basis for changing practice and improving patient outcomes. Prerequisite: NUR 510/PVM 541 or equivalent; pre- or co-requisite: NUR 501.

3.00, Online Only

**NUR-522 Health Promotion and Disease Prevention
Diverse Populations**

This course is designed to provide students with knowledge enabling them to assess diverse populations and discuss the major biological and psychosocial health problems in terms of risk and prevention. Students will be able to describe broad constructs of health promotion and steps for initiating and evaluating programs that address health problems of national and local concern, including attention to cultural sensitivity.

3.00, Online Only

NUR-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

Continuous Enrollment

OBG-703 Core Clerkship: Obstetrics & Gynecology

The course in clinical obstetrics and gynecology is designed to familiarize the student with the female reproductive tract. Emphasis is placed on routine obstetrics and gynecologic health care maintenance and patient education. Identification and management of high-risk pregnancy, infertility and other endocrinopathies, gynecologic oncology, family planning psychosomatic disorders, and normal physiological changes in obstetrics and gynecology as well as gynecologic surgery are some of the areas covered in detail.

6.00, Clinical | Web Component

OBG-731 Maternal-Fetal/High Risk

Emphasis of this elective is on the identification and management of high risk pregnancy. Ultrasonography, amniocentesis, medical and surgical complications of pregnancy, and operative obstetrics are some of the specific topics dealt with in detail. Students participate in ante-partum management of hospitalized and ambulatory pregnant patients with high risk conditions. Additional exposure to intra-partum problems is obtained through daily clinical teaching rounds and through follow-up of high-risk ante-partum patients as they go through labor and delivery. Special experiences and involvement in genetic counseling, prenatal diagnosis and obstetric ultrasound are also available.

4.00, Clinical

OBG-761 Gynecologic Oncology

The purpose of the senior elective rotation is to expose the student directly to medical, surgical, and research aspects of gynecological cancer care, beyond the scope of what is achieved during short-term required rotations. The student functions as a partner in a team of attendings, residents and nurses.

2.00-4.00, Clinical

OBG-767 Reproductive Endocrinology & Infertility

This elective provides clinical experience in diagnostic evaluation and therapeutic management of couples with infertility and women with gynecologic endocrine problems. The students participate in routine diagnostic studies such as ovulation timing, postcoital tests, endocrine evaluation, etc., and are introduced to the use of diagnostic and therapeutic procedures such as hysterosalpingography, ultrasonography, laparoscopy, hydrotubation, etc. The students scrub on surgical reconstructive procedures involving female reproductive system and participate in the activities of the in-vitro fertilization program. Laboratory experience in performing hormone radioimmunoassay, sperm separation, and other procedures may also be included.

4.00, Clinical

OBG-781 Research: Obstetrics & Gynecology

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00-8.00, Clinical

OBG-7EI Obstetrics

Students may receive credit for an individually arranged elective with a Rush faculty members. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

4.00, Clinical

OBG-EXM OB/GYN Exam Remediation

Remediation of OBG 703 - Core Clerkship: Obstetrics Gynecology through exam retake only.

2.00-8.00, Clinical

OBG-REM Obstetrics Clinical Remediation

Remediation of core Obstetrics & Gynecology clinical weeks only – student not required to repeat exam.

4.00, Clinical

OCC-500 Occupational Therapy Orientation/Computer Applications

This course is designed to familiarize the occupational therapy student with general Occupational Therapy practice, curriculum and professional organizations. An additional component of this

class is computer applications in areas related to scholarly and clinical components of occupational therapy.

2.00, Classroom | Web Component

OCC-502 Occupational Therapy History and Philosophy

Overview of the historical foundations of occupational therapy as they relate to the frames of reference and philosophical perspectives upon which the field is based.

4.00, Classroom | Web Component

OCC-503 Occupation, Health and Development

The dimensions of occupation, as well as, its dynamic and reciprocal relationship between the health, wellness and illness continua will be explored. In addition, examination of the life span developmental process and its relationship to the performance of societal roles including one's chosen occupations will be facilitated. By integrating the concepts of occupation, health and development, their impact on the human's functional skills and occupational performance throughout the life-span will also be considered.

3.00, Classroom | Web Component

OCC-503 Occupation & Health Across Lifespan

The dimensions of occupation, as well as, its dynamic and reciprocal relationship between the health, wellness and illness continua will be explored. In addition, examination of the life span developmental process and its relationship to the performance of societal roles including one's chosen occupations will be facilitated. Synthesis of the concepts of occupation, wellness and illness continua, and changes in physical, environmental and/or occupational opportunity and occupational participation over the life span will be reflected upon. Adaptations to maximize social and occupational participation will be considered. The congruence of these concepts with occupational theories will also be discussed.

4.00, Classroom | Web Component

OCC-503 Occupation & Health Across Lifespan

The dimensions of occupation, as well as, its dynamic and reciprocal relationship between the health, wellness and illness continua will be explored. In addition, examination of the life span developmental process and its relationship to the performance of societal roles including one's chosen occupations will be facilitated. Synthesis of the concepts of occupation, wellness and illness continua, and changes in physical, environmental and/or occupational opportunity and occupational participation over the life span will be reflected upon. Adaptations to maximize social and occupational participation will be considered. The congruence of these concepts with occupational theories will also be discussed.

3.00, Classroom | Web Component

OCC-504 Human Structure and Principles of Movement

The primary goal of this course is to understand and evaluate some of the musculoskeletal system related to the skill components of occupational behavior. Biomechanical principles are presented with application to treatment in examples of occupational performance dysfunction. The student will learn and demonstrate the ability to give evaluation of posture, joint motion, muscle strength and body mechanics in selected activities.

4.00, Classroom | Web Component

OCC-505 Clinical Foundations Skills

The primary goal is for students to acquire basic clinical reasoning and practice skills as a foundation for their clinical placements and preceptorship at Rush University Medical Center and in the community. Pass/no pass grading only.

1.00, Classroom | Web Component

OCC-505 Clinical Foundations Skills

The primary goal is for students to acquire basic clinical reasoning and practice skills as a foundation for their clinical placements and preceptorship at Rush University Medical Center and in the community. Pass/no pass grading only.

2.00, Classroom | Web Component

OCC-506 Medical Conditions Seminar

Selected medical, surgical, neurological and orthopedic conditions with emphasis on their etiology, treatment and prognosis will be explored through presentations and discussions.

3.00, Classroom | Web Component

OCC-507 Psychosocial Dysfunction

This course focuses on the functional abilities that are compromised by mental disorders and the side effects of pharmacotherapy. Interdisciplinary and occupational therapy interventions of mental disorders and chemical dependency are reviewed from the rehabilitation and occupational performance perspectives.

3.00, Classroom | Web Component

OCC-508 Group Dynamics

Didactic and experiential activities designed to familiarize the student with basic principles underlying group process and group behavior and clinical application of these principles in occupational therapy are studied.

3.00, Classroom | Web Component

OCC-509 Analysis of Occupational Performance

Focus will be on the development of task analysis skills by applying logical thinking, critical analysis, problem solving and creativity. Students will demonstrate an ability to grade and adapt occupation-based tasks and purposeful activity including

the interaction of performance areas, components, and contexts through dynamic classroom exercises.

3.00, Classroom | Web Component

OCC-510 Occupational Therapy Perspectives in Ethics and Multiculturalism

This course will focus on understanding the many dimensions of multiculturalism so that the students may develop a basis from which to be sensitive to the uniqueness of individuals. Various perspectives with regards to the cultural beliefs about health, illness, and treatment and how these beliefs direct the formation of policy will also be explored. This course will conclude with the presentation of potential ethical and legal dilemmas in occupational therapy practice and experiential opportunities to use a range of problem solving techniques to handle these situations.

3.00, Classroom | Web Component

OCC-511 Occupational Therapy Interventions I

Students learn to apply theories and conceptual models for restoration of occupational performance based on psychosocial principles. The occupational therapy planning and implementation process is introduced and developed through concurrent interface with the pre-clinical experience.

5.00, Classroom | Web Component

OCC-512 Occupational Therapy Interventions II

Students learn to apply theories and conceptual models for the restoration of occupational performance based on biomechanical and rehabilitative principles. Laboratory component includes splinting, wheelchair/positioning experiences and skill building in interventions and documentation. This course interfaces with the pre-clinical experience.

5.00, Classroom | Web Component

OCC-513 Occupational Therapy Interventions III

Students learn to apply theories and conceptual models for the restoration of occupational performance based on motor learning, cognitive-perceptual and rehabilitation models of practice. Student will become familiar with basic splinting principles and demonstrate skill in constructing static splints. The occupational therapy planning and implementation process is introduced and developed through concurrent interface with the pre-clinical experience.

5.00, Classroom | Web Component

OCC-514 Occupational Therapy Interventions IV

Students learn to apply theories and conceptual models for the prevention, development, remediation and restoration of occupational performance as it relates to various pediatric populations.

4.00, Classroom | Web Component

OCC-516 Occupational Therapy Interventions I

Fieldwork

This course will offer lecture and practical application opportunities to facilitate the development of professional behaviors required for successful fieldwork experiences. A supervised Level I fieldwork experience related to the theory and application of occupational therapy in the areas of physical disabilities, pediatrics and psychosocial practice will also be completed.

1.00, Classroom | Web Component | Fieldwork

OCC-517 Occupational Therapy Interventions II

Fieldwork

This course will provide didactic and lab training of the use of physical agent modalities. In addition, this course focuses on development of professional behaviors to prepare students for fieldwork experiences. A supervised two-week field experience related to the theory and application of occupational therapy in the areas of biomechanical, rehabilitation and psychosocial principles will also be a component of this course.

1.00, Classroom | Web Component | Fieldwork

OCC-518 Occupational Therapy Interventions III

Fieldwork

This course will provide didactic and lab training of the use of physical agent modalities and review of clinical skills necessary for successful completion of Fieldwork experiences. In addition, this course focuses on development of professional behaviors to prepare students for fieldwork experiences. A supervised two-week field experience related to the theory and application of occupational therapy in the areas of biomechanical, rehabilitation and psychosocial principles will also be a component of the course.

1.00, Classroom | Web Component | Fieldwork

OCC-525 Introduction to Neuroscience

Lecture-discussion formats cover the anatomy, functions, and the selected lesion of the central and peripheral nervous systems. The student will learn the basic principles of organization, structure and function within the human nervous system and correlate specific clinical signs and symptoms to lesions within the central and peripheral nervous systems. Examples of application to medical care and occupational therapy are included in selected assessment and treatment descriptions.

4.00, Classroom | Web Component

OCC-530 Occupational Therapy Perspectives in Health & Wellness

This course provides students with a holistic overview of the multi-faceted dimensions of health and wellness across the lifespan. The six dimensions of health are explored within the

context of occupational therapy. Students will also examine the influence of chronic disease on health, wellness, and occupational performance.

2.00, Classroom | Web Component

OCC-531 Principles and Methods of Education

This course offers a range of practical methods for teaching and facilitating learning geared to the day-to-day realities encountered by occupational therapists. The students will explore a variety of learning and educational theories and their application so that they may be effective in their daily teaching experiences with clients, families and colleagues. Experiences with both face to face interactions and long distance education and training will be provided.

2.00, Classroom | Web Component

OCC-532 Occupational Therapy Perspectives in Technology

Exposure to assistive technology with emphasis on assessment, selection, characteristics and application. Emphasis will be on low-technology and high-technology devices and systems to include wheelchairs, seating systems, switches and computer units and the indications for use in the role of human performance.

2.00, Classroom | Web Component

OCC-536 Issues and Perspectives in Pediatric Occupational Therapy

Issues and perspectives, which are unique to the pediatric population are explored in this course. The course begins with foundational topics of occupational performance as it relates to various pediatric populations. To provide the students with clinical reasoning tools used in the occupational therapy process with children and their families, exploration of various frames of reference is then completed.

4.00, Classroom | Web Component

OCC-537 Issues and Perspectives in Geriatric Occupational Therapy

Focuses on an understanding of the occupational therapist's role in working with the geriatric population including service delivery systems, normal and pathological changes occurring as one ages and specific interventions utilized by practitioners.

3.00, Classroom | Web Component

OCC-538 Evaluation & Assessments

Administration, scoring, interpretation, and reporting of selected tests and informal assessments useful in an occupational therapy evaluation of clients of varying ages and disability will be examined in this course. Students will critically assess the merits of various instruments based upon the essential components of credibility, and will recognize the strengths and limitations of the

instruments reviewed. Focus on the clinical reasoning used in the evaluation and re-evaluation process [i.e. selection of assessments, interpretation and application of results] will be explored and implemented. Ethical considerations required in evaluation process will also be addressed.

3.00, Classroom | Web Component

OCC-543 Health Care Organizations

This course reviews and identified the factors, forces and dynamics of the environment in which health care services are provided. The interrelationships among various trends and forces likely to shape the roles and responsibilities of health care institutions in the future and their impact on occupational therapy will be discussed

3.00, Classroom | Web Component

OCC-544 Management Concepts for Occupational Therapy

Students will examine administrative activities related to the effective delivery of OT services, including program planning, organization, control and leadership. Personnel management, communication and effective use of professional and non-professional staff, fiscal accountability, quality management, marketing/promotions, and resource allocation will be presented.

2.00, Classroom | Web Component

OCC-544 Management Concepts for Occupational Therapy

Students will examine administrative activities related to the effective delivery of OT services, including program planning, organization, control and leadership. Personnel management, communication and effective use of professional and non-professional staff, fiscal accountability, quality management, marketing/promotions, and resource allocation will be presented.

3.00, Classroom | Web Component

OCC-580 Research Methods

The focus of this course is on different types of research methods and design specific to quantitative research methodology. As part of this course students read and interpret research literature to develop further their understanding of the application of these different methods to occupation based research. The course includes a discussion of the contributions of different levels of research to developing experimental designs that allow evidence for the effect of therapeutic interventions in Occupational Therapy.

1.00, Classroom | Web Component

OCC-581 Introduction to Research

The student develops skill in critically analyzing research studies, formulating research problems, designing research methods, using descriptive and inferential statistics to interpret data, analyzing data using parametric and nonparametric statistical models, and developing beginning competencies in the use of computers in research.

4.00, Classroom | Web Component

OCC-581 Qualitative Research Method and Design

This course provides the students with an opportunity to explore and experience how both mixed methods and qualitative research methodologies are used in clinical and management outcome research. Emphasis will be on design, data collection, analysis and interpretation, as well as, communication and presentation of findings.

2.00, Classroom | Web Component

OCC-582 Research II

This course provides the students with an opportunity to explore and experience how both quantitative and qualitative research methodologies are used in clinical and management outcome research. Emphasis will be on design, data collection, analysis and interpretation, as well as, communication and presentation of findings.

4.00, Classroom | Web Component

OCC-582 Quantitative Research: Evidence Base Practice

This course provides the students with an opportunity to explore and experience how quantitative research is used and interpreted for evidence based outcomes research and clinical practices and research. Emphasis will be on the history and implementation of evidence based practice (EBP) in occupational therapy through the professional organization and national health care leadership. Different research designs and their individual relationships to levels of evidence as well as their contribution to internal and external validity of the research are discussed. Methodologies for accruing evidence such as systematically using a search engine, asking an appropriate EB clinical question and using a PICO, CAP and CAT format are integral to course learning. Team based learning principles are used throughout the class.

3.00, Classroom | Web Component

OCC-582 Research Methods & Evidence Based Practice

This course provides the foundation for participation in clinical research and the importance of evidence based practice in occupational therapy. Emphasis will be on quantitative research design, data analysis strategies, and the incorporation of

evidence based practice to clinical practice. This course will serve as a basis for research projects with assigned research faculty (Prerequisites: CHS 501) LT
3.00, Classroom | Web Component

OCC-583 Research III

This course culminates the research sequence in the occupational therapy curriculum. It provides students with the opportunities to explore and experience clinical research and the outcomes that guide practice. The clinically-based beginning research investigator activities are conducted under the guidance of faculty in selected clinical programs. Emphasis will be on strategies related to collection, analysis, interpretation and reporting findings of data used to evaluate clinical practice. Small groups of students participate in weekly faculty-student seminars to explore the literature, activities and processes associated with the clinical outcomes studies culminating in a final report and presentation.

1.00-6.00, Classroom | Web Component

OCC-583 Graduate Research Project

This course culminates the research sequence in the occupational therapy curriculum. It provides students with the opportunities to explore and experience clinical research and the outcomes that guide practice. The clinically-based beginning research investigator activities are conducted under the guidance of faculty in selected clinical programs. Emphasis will be on strategies related to collection, analysis, interpretation and reporting findings of data used to evaluate clinical practice. Small groups of students participate in weekly faculty-student seminars to explore the literature, activities and processes associated with the clinical outcomes studies culminating in a final report and presentation.

1.00-6.00, Classroom | Web Component

OCC-583 Graduate Research Project

OCC-583 is a continuous course beginning in the fourth quarter of the program with a grade and credit assigned upon completion of the ninth quarter. This is a continuous course, which culminates the research sequence in the occupational therapy curriculum. It provides students with the opportunities to explore and experience research. Emphasis will be on the communication of strategies related to collection, analysis, interpretation and reporting of research findings. Small groups of students participate in weekly faculty-student seminars. The final project is a professional paper and presentation. Note, for part-time students, this course will start during the eighth quarter with a grade and credit assigned upon completion of the thirteenth quarter.

1.00-6.00, Classroom

OCC-590 Advanced Practice Seminar

This is a capstone course in which all aspects of practice are integrated and analyzed through a series of case studies and group projects. Students use clinical, scientific and ethical reasoning skills to work through a series of carefully designed problem-based learning projects. Cases are structured to reflect clinical complexities, nontraditional service delivery settings as well as emerging areas of practice. Professional development and competencies for varied professional roles and functions such as entry-level versus advanced practitioner, clinical specialist, supervisor/manager, educator, consultant, private practitioner, program developer, grantsmanship, researcher, entrepreneur, and advocate are explored. A series of lectures and invited speakers on certification, licensure and employment opportunities will be included.

4.00, Classroom | Web Component

OCC-590 Advanced Practice Seminar

This course will expose students to advanced and emerging practice topics to foster interest in future professional growth opportunities. Professional development and competencies for varied specialized role and functions are also explored. This course will provide didactic lectures, invited speakers and intentionally designed field outings to deliver the course content.

3.00, Classroom | Web Component

OCC-595 Advanced Fieldwork I

Supervised field experiences applying theoretical O.T. concepts on subjects having psychosocial/physical dysfunctions. Full-time student status is continued while engaged in fieldwork.

12.00, Fieldwork | Web Component

OCC-596 Advanced Fieldwork II

Supervised field experiences applying theoretical O.T. concepts on subjects having psychosocial/physical dysfunctions. Full-time student status is continued while engaged in fieldwork.

12.00, Fieldwork | Web Component

OCC-598A Preparation for Master's Thesis

This course will introduce the students to the master's thesis process. It will allow students to explore various topics in OT and to select a research problem relevant to current occupational therapy practice for their thesis project. * Completion of thesis option will require enrollment in at least 9 credit hours between OCC 598A, OCC 598B, and OCC 598C.

1.00, Classroom

OCC-598B Master Thesis Proposal

Student will complete and defend preliminary thesis proposal. After revisions are made, student will complete and submit IRB

proposal. Completion of thesis option will require enrollment in at least 9 credit hours between OCC 598A, OCC 598B, and OCC 598C.

1.00-7.00, Classroom

OCC-598C Research Implementation

Student will finalize preparation for research implementation, after which, implementation of thesis project based on research proposal will be completed and defended. Topic is to be relevant to current occupational therapy practice. Completion of thesis option will require enrollment in at least 9 credit hours between OCC 598A, OCC 598B, and OCC 598C.

1.00-7.00, Classroom

OCC-604 Critical Topics in Occupational Therapy

This is an independent study in which the student in collaboration with faculty advisor will choose a topic of interest. Focus of course will be on thorough analysis and application of the topic. Project will be defined by student in association with faculty advisor.

2.00, Classroom

OCC-900 Independent Study

Creative project designed by the student and supervised by faculty.

1.00-12.00, Classroom

OCC-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

PAS-510 Human Anatomy & Physiology I

This 2-part course provides a thorough foundation of functional and applied human anatomy and physiology as a basis for understanding the mechanisms of disease. Lectures, anatomic models, and cadaver prosections will be utilized in teaching this course. Anatomy & Physiology I will cover the central nervous, cardiovascular, respiratory system, and lymphatic systems.

5.00, Class & Lab | Web Component

PAS-510 Human Anatomy

The human anatomy course will provide students with a thorough understanding of functional and applied human anatomy. Lectures, anatomic models, and cadaver dissection will be utilized in teaching this course.

7.00, Classroom | Laboratory | Web Component

PAS-511 Human Physiology

This course is designed to provide students with a comprehensive understanding of human physiologic function, regulation, and integration as a basis for understanding the complex interaction of specific body systems and their relationship to disease.

6.00, Classroom | Web Component

PAS-512 History & Physical I

This 2-part course will prepare students to conduct effective medical interviews, use appropriate formatting to document and orally present clinical information, perform comprehensive physical examinations, and interpret examination findings. In PAS 512, students will learn and practice interviewing techniques and interpersonal communication skills that result in effective exchange of information with patients, their families, and other health care providers. Instruction on the components of the health history (chief complaint, present illness, past history, family history, personal and social history, review of symptoms) is provided.

2.00, Classroom | Web Component

PAS-513 Seminar I

Each semester, this course will explore key subjects important to PA function in clinical practice. Seminar I will explore the history and development of the PA profession, the physician-PA relationship, scope of practice and professional regulations, licensure, certification/recertification, PA program accreditation, and PA professional organizations. The course will also cover legal issues in health care related to PA practice, including the Healthcare Information Portability and Accountability Act (HIPAA), professional liability, laws and regulations regarding prescriptive practices, reimbursement, coding and billing, quality assurance, and risk management.

1.00, Classroom | Web Component

PAS-513 Physicians Assistant Professional Issues

This course will explore key subjects important to PA function in clinical practice. Topics include the history and development of the PA profession, the physician-PA relationship, PA scope of practice and professional regulations, licensure, certification/recertification, PA program accreditation, and PA professional organizations. The course will also cover legal issues in health

care related to PA practice, including the Healthcare Information Portability and Accountability Act (HIPAA), professional liability, laws and regulations regarding prescriptive practices, reimbursement, coding and billing, quality assurance, and risk management.

1.00, Classroom | Web Component

PAS-513 Physicians Assistant Professional Issues and Ethics

This course is designed to introduce and familiarize the student with the major issues of importance to the Physician Assistant (PA) profession. The course will cover the PA profession's history and evolution, the scope of PA practice in healthcare today, the requirements to attain and maintain professional certifications and licensure, as well as professional issues facing physician assistant practice moving forward into the future. The course will also introduce students to foundational theories of healthcare ethics, ethical decision-making frameworks, and professional standards of ethical behavior.

2.00, Classroom | Web Component

PAS-514 Diagnostic Methods I

A 2-part course discusses the essentials of ordering, interpreting, and performing clinical studies used in the screening, diagnosis, management, and monitoring of human disease. PAS 514 will cover topics related to clinical laboratory studies (hematology, chemistry, microbiology, urinalysis, molecular diagnostic techniques, histology, cytology, skin testing, sputum, and pleural fluid examination), blood gases. PAS 534 will discuss basic radiography and advanced imaging (CT, MRI, PET/CT) techniques, the electrocardiogram, pulmonary function and stress testing, sonography, endoscopy techniques, and sleep laboratory. Using diagnostic testing in disease assessment and management including generation of the differential diagnosis is included throughout both courses.

2.00, Classroom | Web Component

PAS-520 Human Anatomy & Physiology II

This 2-part course provides a thorough foundation of functional and applied human anatomy and physiology as a basis for understanding the mechanisms of disease. Lectures, anatomic models, and cadaver dissections will be utilized in teaching this course. Anatomy & Physiology I will cover the central nervous, cardiovascular, respiratory system, and lymphatic systems.

4.00, Classroom | Web Component

PAS-521 Clinical Medicine II

This four-series course covers the essential principles of disease diagnosis and management for the major problems seen by PAs in clinical practice. Using an organ systems approach, lectures

and case analysis will discuss the etiology, pathophysiology, diagnosis, and management of disease. Lectures on patient assessment and management considerations will include the generation of a differential diagnosis, the role of pharmacotherapeutic and adjuvant therapies, and appropriate patient referral issues. An introduction to molecular medicine and the genetic and molecular mechanisms of health and disease will be discussed as a part of each clinical topic. Instruction in important aspects of patient care will include considerations of prevention and long-term and rehabilitative care issues. Case studies and patient simulations will be used to teach problem solving and clinical decision-making using an evidence-based practice approach.

5.00, Classroom | Web Component

PAS-521 Clinical Medicine I

This three-series course covers the essential principles of disease diagnosis and management for the major problems seen by PAs in clinical practice. Using an organ systems approach, lectures and case analysis will discuss the etiology, pathophysiology, diagnosis and management of disease. Lectures on patient assessment and management considerations will include the generation of a differential diagnosis, the role of pharmacotherapeutic and adjuvant therapies, and appropriate patient referral issues. Instruction in important aspects of patient care will include considerations of prevention and long-term and rehabilitative care issues. Case studies will be used to teach problem solving and clinical decision-making using an evidence-based practice approach.

5.00, Classroom | Web Component

PAS-522 History & Physical Examination II

This 2-part course will prepare students to conduct effective medical interviews, use appropriate formatting to document and orally present clinical information, perform comprehensive physical examinations, and interpret examination findings. PAS 522 will cover the performance and interpretation of the physical examination including the general survey of the patient, vital signs, skin, head and neck exam, thorax and lungs, cardiovascular and peripheral vascular systems, breasts and axillae, abdomen, genitalia and rectal exams, musculoskeletal system, and the mental status and nervous system exams. Special considerations for assessing infants and children and the obstetrical patient will also be covered.

3.00, Class & Lab | Web Component

PAS-524 Diagnostic Methods I

A 2-part course discussing the essentials of ordering, interpreting, and performing clinical studies used in the screening, diagnosis, management, and monitoring of human disease. Topics include clinical laboratory studies (hematology, chemistry, microbiology, urinalysis, molecular diagnostic techniques, histology, cytology, skin testing, sputum, and pleural fluid examination), blood gases,

pulmonary function and stress testing, basic radiography and advanced imaging (CT, MRI, PET/CT) techniques, sonography, the electrocardiogram, endoscopy techniques, nutritional assessment, and sleep laboratory. Advanced patient care monitoring techniques will be introduced to include EKG interpretation, oximetry, and hemodynamic monitoring, telemetry and the use of telemedicine techniques. Using diagnostic testing in disease assessment and management including generation of the differential diagnosis is included.

2.00, Classroom | Web Component

PAS-530 Microbiology & Infectious Disease

This course will provide a review of the general biology of infectious agents and the basic concepts and principles of immunology, including medically important microorganisms and their relationship to disease. Identification of selected groups of pathogens, epidemiology, mechanisms causing disease and the biological basis for resistance will be covered. Identification, classification, cellular structure, pathogenic mechanisms, genetics, epidemiology, serology, and prevention and treatment of disease will be described.

2.00, Classroom | Web Component

PAS-531 Clinical Medicine II

The PAS-521, -531 and -541 course series covers the essential principles of disease diagnosis and management for the major problems seen by PAs in clinical practice. Using an organ systems approach, lectures and case analysis will discuss the etiology, pathophysiology, diagnosis and management of disease. Lectures on patient assessment and management considerations will include the generation of a differential diagnosis, the role of pharmacotherapeutic and adjuvant therapies, and appropriate patient referral issues. Instruction in important aspects of patient care will include considerations of prevention and long-term and rehabilitative care issues. Case studies will be used to teach problem-solving and clinical decision-making using an evidence-based practice approach. Clinical topics will include neurologic disease; cardiovascular disease; pulmonary and critical care medicine; gastrointestinal disease; diseases of the hepatobiliary system; renal disease; genito-urinary disorders; hematological disease; oncologic disease; immunological disorders; metabolic disease; endocrine disease; rheumatology and diseases of bone and bone mineral metabolism; musculoskeletal and connective tissue disease; and dermatologic disease. An introduction to molecular medicine and the genetic and molecular mechanisms of health and disease will be discussed as well. Disorders related to specific populations such as the aging patient and women's health will be discussed and a systematic presentation of behavioral medicine and psychiatry to include

the normal psychological development of across the lifespan is provided. Health promotion and disease prevention, diet and nutrition, detection and treatment of substance abuse will also be discussed.

5.00, Classroom | Web Component

PAS-533 Seminar III

Critical thinking and evidence-based practice will be introduced and techniques for identifying the best evidence for clinical decision-making will be explored. Using case study analysis, clinical reasoning and decision making in medical practice, patient assessment, management, care plan development, and health promotion and counseling as part of patient management will be discussed. Techniques for correct oral presentation of patient data to a supervising physician will also be covered.

1.00, Classroom | Web Component

PAS-533 Diagnostic Reasoning

This course will introduce students to critical thinking skills essential to patient care and evaluation. Evidence-based practice will be introduced and techniques for identifying the best evidence for clinical decision-making will be explored. Using case study analysis, clinical reasoning and decision making in medical practice, patient assessment, management, care plan development, and health promotion and counseling as part of patient management will be discussed. Techniques for correct oral presentation of patient data to a supervising physician will also be covered.

2.00, Classroom | Web Component

PAS-534 Diagnostic Methods II

A 2-part course discussing the essentials of ordering, interpreting, and performing clinical studies used in the screening, diagnosis, management, and monitoring of human disease. Topics include clinical laboratory studies (hematology, chemistry, microbiology, urinalysis, molecular diagnostic techniques, histology, cytology, skin testing, sputum, and pleural fluid examination), blood gases, pulmonary function and stress testing, basic radiography and advanced imaging (CT, MRI, PET/CT) techniques, sonography, the electrocardiogram, endoscopy techniques, nutritional assessment, and sleep laboratory. Advanced patient care monitoring techniques will be introduced to include EKG interpretation, oximetry, and hemodynamic monitoring, telemetry and the use of telemedicine techniques. Using diagnostic testing in disease assessment and management including generation of the differential diagnosis is included.

2.00, Classroom | Web Component

PAS-535 Pediatrics

Care of infants and children as seen in the primary care, acute care and emergency care setting will be discussed. A chronological approach is used to address preventive health care services, and the assessment and management of acute and chronic health problems found in infants, children and adolescents. Instruction is provided in the stages of normal psycho-social, physical, and sexual development in children and adolescents. 3.00, Classroom | Web Component

PAS-541 Clinical Medicine III

Three-series course covers the essential principles of disease diagnosis and management for the major problems seen by PAs in clinical practice. Using an organ systems approach, lectures and case analysis will discuss the etiology, pathophysiology, diagnosis, and management of disease. Lectures on patient assessment and management considerations will include the generation of a differential diagnosis, the role of pharmacotherapeutic and adjuvant therapies, and appropriate patient referral issues. Instruction in important aspects of patient care will include considerations of prevention and long-term and rehabilitative care issues. Case studies will be used to teach problem solving and clinical decision-making using an evidence-based practice approach. Clinical topics will include: neurologic disease; cardiovascular disease; pulmonary and critical care medicine; gastrointestinal disease; diseases of the hepatobiliary system; renal disease; genito-urinary disorders; hematological disease; oncologic disease; immunological disorders; metabolic disease; endocrine disease; rheumatology and diseases of bone and bone mineral metabolism; musculoskeletal and connective tissue disease; and dermatologic disease. An introduction to molecular medicine and the genetic and molecular mechanisms of health and disease will be discussed as well. Disorders related to specific populations such as the aging patient and women's health will be discussed and a systematic presentation of behavioral medicine and psychiatry to include the normal psychological development of across the lifespan is provided. Health promotion and disease prevention, diet and nutrition, detection and treatment of substance abuse will also be discussed. 5.00, Classroom | Web Component

PAS-542 Fundamentals of Surgery

An introduction to surgical concepts needed for the physician assistant to provide care and assist the surgeon in major surgical areas, such as a day surgery unit or a hospital operating room. Lectures will discuss indications for surgery, and surgical concepts and techniques such as asepsis, anesthesia (general, local, and conscious sedation), and wound management.

Specific surgical techniques used for day surgery, elective surgery, emergency surgery, abdominal and thoracic surgery, minimally invasive surgery, laparoscopic and arthroscopic surgery, microsurgery, robotic surgery, and organ transplant surgery will be described. Pre- and post operative patient assessment and management will be discussed.

3.00, Classroom | Web Component

PAS-543 Seminar IV

This course will explore the psychosocial aspects of patient care. Instruction will be provided in basic counseling and patient education skills necessary to help patients and families cope with illness and injury, adhere to prescribed treatment plans and modify their behaviors to more healthful patterns. Discussions will also include issues of culture and sexuality and the impact these forces have on attitudes towards health, patient counseling, and health policy.

1.00, Classroom | Web Component

PAS-543 Psychosocial Medicine

Psychosocial Medicine will explore the psychosocial aspects of patient care. Instruction will be provided in basic counseling and patient education skills necessary to help patients and families cope with illness and injury, adhere to prescribed treatment plans and modify their behaviors to more healthful patterns. Discussions will also include issues of culture and sexuality and the impact these forces have on attitudes towards health, patient counseling, and health policy. The course will also cover issues of domestic violence and establishing systems to identify and support victims of domestic violence.

1.00, Classroom | Web Component

PAS-545 Emergency Medicine

An introduction to the diagnosis and treatment of disease states and conditions encountered in an emergency setting to include the response to illness, injury and stress. Basic and advanced life support, airway management, and cardiopulmonary resuscitation; management of chest pain, acute cardiac events, congestive heart failure and pulmonary edema; shock, trauma and environmental injuries; endocrine emergencies; hematologic and oncologic emergencies; poisoning, abdominal disorders, gastrointestinal bleeding; asthma, COPD, pneumonia and acute respiratory failure; neurologic disease, altered mental status and behavioral emergencies; detection and treatment of substance abuse and drug overdose; eye, ear, nose and throat emergencies; anaphylaxis; infectious disease in the ED; common emergencies in infants and children and disaster preparedness and response are some of the topics that will be covered.

3.00, Classroom | Web Component

PAS-579 Master's Research Project

Building on both the concepts taught in PAS 502, and on the evidence based evaluation and application skills developed during the academic year of the program, students will work with a faculty advisor to develop a clinical research question and then gather, analyze, and critique relevant research literature related to the proposed question. The student will then prepare a master's length thesis paper that synthesizes the research literature to derive a clinically appropriate recommendation to the proposed clinical question. Finally, students will defend their project in either an oral presentation or in a poster presentation. Acceptable arenas for defense presentations will be either to the University faculty or at an institutionally recognized research forum or conference.

2.00, Classroom | Web Component

PAS-580 Master's Research Project

Building on concepts taught in CHS 503 - Research and Statistical Methods, and on the evidence based evaluation and application skills developed during the academic year of the program, students will work with a faculty advisor to develop a clinical research question and then gather, analyze, and critique relevant research literature related to the proposed question. The student will then prepare a master's length thesis paper that synthesizes the research literature to derive a clinically appropriate recommendation to the proposed clinical question. Finally, students will defend their project in an oral presentation to the faculty, and submit to a peer forum for publication. Acceptable arenas for peer presentations will be to the University faculty, the PA Student Writing Competition, or other institutionally recognized research forum or conference.

2.00, Laboratory

PAS-581 Family Medicine

During this experience in family medicine, students see patients, perform assessments and formulate care plans under the supervision of a physician, PA or advanced practice nurse. Comprehensive, longitudinal care is stressed. Common problems are reviewed and the responsibilities of a primary care physician assistant are observed and taught. Principles of health, wellness, prevention, recognition and treatment of substance abuse, and chronic disease management and chronic care are introduced in the clinical setting. Patient assessment and management are reviewed to include the generation of a differential diagnosis, and oral presentation of patient data to the supervising physician and appropriate referral of patients.

4.00, Clinical

PAS-582 Internal Medicine

This rotation is designed to introduce students to the practice of internal medicine. Through participating directly in patient care, students have the opportunity to evaluate and manage a variety of patients and their health problems. Students further develop their skills in history taking and physical examination and review pathophysiologic principles as a guide to caring for patients. The rotation stresses the team approach to patient care, which allows students the opportunity to actively work toward the goals of quality patient care while reinforcing medical principles. Patient assessment and management are reviewed to include the generation of a differential diagnosis, oral presentation of patient data to the supervising physician and appropriate patient referral.

8.00, Clinical | Web Component

PAS-583 General Surgery

The principles of preoperative and postoperative patient care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery are presented. Technical training is provided through operating room experience. Participation in lectures and conferences provide additional didactic surgical learning experience.

8.00, Clinical

PAS-584 Women's Health/Obstetrics & Gynecology

The student will learn the routine care, counseling and education, and health maintenance for obstetric and gynecologic patients. Identification and management considerations for gynecologic surgery, high-risk pregnancy, infertility, gynecologic oncology, and family planning, including the normal psychological changes in obstetrics and gynecology are introduced.

4.00, Clinical

PAS-585 Pediatrics

Principles and practice of care for the child from birth through adolescence through patient care experiences. Students will learn principles of basic pediatric assessment, diagnosis, and treatment. Both inpatient and outpatient clinical facilities will be utilized. Seminars, conferences, lectures, and case presentations will provide additional learning experiences. Pediatric patient assessment and management are reviewed to include the generation of a differential diagnosis, oral presentation of patient data to the supervising physician and appropriate referral of patients.

8.00, Clinical

PAS-586 Behavioral Health

This rotation will provide students with clinical experience recognizing and managing patients with behavioral disorders. Emphasis is placed on understanding disorder diagnosis and the therapeutic modalities available for patient management, recognizing significant biological, psychological, and social/environmental factors contributing to the patient's illness.

4.00, Clinical

PAS-587 Long-Term Care/Geriatrics

Supervised clinical practice experience is provided in the long-term and geriatric care setting, with a focus on rehabilitative medicine and the care of patients with chronic disease. Physical therapy, occupational therapy, and rehabilitation of patients with physical, behavioral and social disabilities is introduced.

4.00, Clinical

PAS-588 Emergency Medicine

Students will see patients in all areas of the emergency department under supervision of attending physicians and PAs. Students will perform histories and physical examinations, record their findings and discuss cases with attending physicians. Students will formulate diagnostic plans, bearing in mind the inherent time and cost factors unique to the ER setting. Patient assessment and management are reviewed to include the generation of a differential diagnosis, oral presentation of patient data to the supervising physician and appropriate referral of patients.

4.00, Clinical

PAS-589 Elective Rotation

Elective rotations may include: general surgery, orthopedics, sports medicine, cardiothoracic surgery, vascular surgery, neurologic surgery, surgical oncology, otolaryngology, cardiology, and pulmonary/critical care medicine. Students may request other elective rotations, but these must be approved by the program director. This four-week rotation may provide a more in-depth study of the clinical practice area that the student may wish to pursue during Phase III of the program.

4.00, Clinical

PAS-590A Internal Medicine Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the internal

medicine advanced rotations, students will have an opportunity to concentrate on general practice skills to provide effective health-care to adults. Emphasis is placed on providing comprehensive maintenance as well as acute and chronic care healthcare across the adult life span.

10.00, Clinical

PAS-590B Pulmonary/Critical Care Medicine Advance Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the pulmonary medicine and critical care advanced rotations, students will be exposed to the diagnosis and management of patients with a wide variety of pulmonary disorders. The essentials of pulmonary physiology, the use and interpretation of pulmonary function testing, and the provision of mechanical ventilatory support are emphasized. Critical care rotations include experiences in various intensive care unit settings.

10.00, Clinical

PAS-590C Emergency Medicine Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the emergency department advanced rotation, students will practice, under the supervision of a staff member, the diagnosis, treatment and follow-up care of patients suffering from both minor and major emergency problems.

10.00, Clinical

PAS-590D Vascular Surgery Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical

care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the surgical advanced rotations, students will review the principles of preoperative and postoperative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery. Students may choose general, thoracic, cardiac/cardiovascular, oncology, or vascular surgery for specialty rotations.
10.00, Clinical

PAS-590E Cardio-Thoracic Surgery Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the surgical advanced rotations, students will review the principles of preoperative and postoperative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery. Students may choose general, thoracic, cardiac/cardiovascular, oncology, or vascular surgery for specialty rotations.
10.00, Clinical

PAS-590F Orthopedics Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the orthopedic advanced rotation, students will acquire an in-depth knowledge of the care and treatment of patients with musculoskeletal problems. Students will work with individual attending physicians and PAs in various areas of orthopedic practice, such as Joint Reconstructive Service, Foot-Ankle-Hand Service, Sports Medicine Service, Pediatric and Tumor Service, or the Spine Service. Students will work in an office clinic setting, assist in surgery, and round on inpatients.
10.00, Clinical

PAS-590G Urology Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the urology advanced rotations, students will gain experience in the diagnosis and management of disorders of the genitourinary system. The discipline crosses both medical and surgical management considerations and emphasis is placed on the recognition of disease and gaining experience across a wide-range of therapeutic modalities.
10.00, Clinical

PAS-590H Interventional Radiology Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the interventional radiology advanced rotation, student will gain familiarity with managing a wide range of disorders using a range of radiographic techniques, including angioplasty, stents, arthrocentesis, and thrombolysis. Interventional radiology involves use these techniques to treat disorders in various organs in combination with imaging techniques, such as fluoroscopy, CT, MRI and/or ultrasound.
10.00, Clinical

PAS-590I Neurosurgery Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the neurosurgery advanced rotation, students will gain familiarity with managing a wide range of neurologic

disorders using a range of surgical techniques, including shunts, burr holes, and stereotactic techniques. Neurosurgery involves the use of these techniques to treat disorders of the central and peripheral nervous system and the spine, in combination with imaging techniques, such as fluoroscopy, CT and/or MRI.

10.00, Clinical

PAS-590J Geriatrics Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the geriatric advanced rotation, student will gain familiarity with managing a wide range of disorders seen in the geriatric population. Geriatric medicine involves treating all organ systems affected by aging, as well as disorders specific to the elderly patient population- such as polypharmacy, falls, and depression. Care of the geriatric patient is often multidisciplinary, and participation in team activities and care planning is required.

10.00, Clinical

PAS-590K Physical Medicine and Rehabilitation Advanced Clinical Practice I

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the physical medicine and rehab advanced rotation, student will gain familiarity with managing a wide range of disorders seen in the adult and pediatric rehabilitation population. Rehabilitation medicine involves diagnosis evaluation, and treatment of patients with cognitive and/or physical disabilities, as well as the management of co-morbidities and pain . Care of the PM and R patient is often multidisciplinary, and participation in team activities and care planning is required.

10.00, Clinical

PAS-591A Internal Medicine Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. The internal medicine advanced rotations, students will have an opportunity to concentrate on general practice skills to provide effective healthcare to adults. Emphasis is placed on providing comprehensive maintenance as well as acute and chronic care healthcare across the adult life span.

10.00, Clinical

PAS-591B Pulmonary/Critical Care Medicine Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the pulmonary medicine and critical care advanced rotations, students will be exposed to the diagnosis and management of patients with a wide variety of pulmonary disorders. The essentials of pulmonary physiology, the use and interpretation of pulmonary function testing, and the provision of mechanical ventilatory support are emphasized. Critical care rotations will be included.

10.00, Clinical

PAS-591C Emergency Medical Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact

hours per week, and night call will generally be required. For the emergency department advanced rotation, students will practice, under the supervision of a staff member, the diagnosis, treatment and follow-up care of patients suffering from both minor and major emergency problems.

10.00, Clinical

PAS-591D Vascular Surgery Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the surgical advanced rotations, students will review the principles of preoperative and postoperative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery. Students may choose general, thoracic, cardiac/cardiovascular, oncology, or vascular surgery for specialty rotations.

10.00, Clinical

PAS-591E Cardio-Thoracic Surgery Advanced Clinical II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the surgical advanced rotations, students will review the principles of preoperative and postoperative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery. Students may choose general, thoracic, cardiac/cardiovascular, oncology, or vascular surgery for specialty rotations.

10.00, Clinical

PAS-591F Orthopedics Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students

will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the orthopedic advanced rotation, students will acquire an in-depth knowledge of the care and treatment of patients with musculoskeletal problems. Students will work with individual attending physicians and PAs in various areas of orthopedic practice, such as Joint Reconstructive Service, Foot-Ankle-Hand Service, Sports Medicine Service, Pediatric and Tumor Service, or the Spine Service. Students will work in an office clinic setting, assist in surgery, and round on inpatients. Students are required to attend various clinical and resident education conferences. All students meet weekly with the course director for a student-only education conference. Educational goals include review of functional anatomy, understanding of injury triage, and concepts of treatment. Night call may be required.

10.00, Clinical

PAS-591G Urology Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the urology advanced rotations, students will gain experience in the diagnosis and management of disorders of the genitourinary system. The discipline crosses both medical and surgical management considerations and emphasis is placed on the recognition of disease and gaining experience across a wide-range of therapeutic modalities.

10.00, Clinical

PAS-591H Interventional Radiology Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology,

neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the interventional radiology advanced rotation, student will gain familiarity with managing a wide range of disorders using a range of radiographic techniques, including angioplasty, stents, arthrectomy, and thrombolysis. Interventional radiology involves use these techniques to treat disorders in various organs in combination with imaging techniques, such as fluoroscopy, CT, MRI and/or ultrasound.
10.00, Clinical

PAS-591I Neurosurgery Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the neurosurgery advanced rotation, students will gain familiarity with managing a wide range of neurologic disorders using a range of surgical techniques, including shunts, burr holes, and stereotactic techniques. Neurosurgery involves the use of these techniques to treat disorders of the central and peripheral nervous system and the spine, in combination with imaging techniques, such as fluoroscopy, CT and/or MRI.
10.00, Clinical

PAS-591J Geriatrics Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the geriatric advanced rotation, student will gain familiarity with managing a wide range of disorders seen in the geriatric population. Geriatric medicine involves treating all organ systems affected by aging, as well as disorders specific to the elderly patient population- such as polypharmacy, falls, and depression. Care of the geriatric patient is often multidisciplinary, and participation in team activities and care planning is required.
10.00, Clinical

PAS-591K Physical Medicine and Rehabilitation Advanced Clinical Practice II

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the physical medicine and rehab advanced rotation, student will gain familiarity with managing a wide range of disorders seen in the adult and pediatric rehabilitation population. Rehabilitation medicine involves diagnosis evaluation, and treatment of patients with cognitive and/or physical disabilities, as well as the management of co-morbidities and pain . Care of the PM and R patient is often multidisciplinary, and participation in team activities and care planning is required.
10.00, Clinical

PAS-592A Internal Medical Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. The internal medicine advanced rotations, students will have an opportunity to concentrate on general practice skills to provide effective healthcare to adults. Emphasis is placed on providing comprehensive maintenance as well as acute and chronic care healthcare across the adult life span.
10.00, Clinical

PAS-592B Pulmonary/Critical Care Medical Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact

hours per week, and night call will generally be required. For the pulmonary medicine and critical care advanced rotations, students will be exposed to the diagnosis and management of patients with a wide variety of pulmonary disorders. The essentials of pulmonary physiology, the use and interpretation of pulmonary function testing, and the provision of mechanical ventilatory support are emphasized. Critical care rotations will be included.

10.00, Clinical

PAS-592C Emergency Medical Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the emergency department advanced rotation, students will practice, under the supervision of a staff member, the diagnosis, treatment and follow-up care of patients suffering from both minor and major emergency problems.

10.00, Clinical

PAS-592D Vascular Surgery Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the surgical advanced rotations, students will review the principles of preoperative and postoperative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery. Students may choose general, thoracic, cardiac/cardiovascular, oncology, or vascular surgery for specialty rotations.

10.00, Clinical

PAS-592E Cardio-Thoracic Surgery Advanced Clinical III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students

will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the surgical advanced rotations, students will review the principles of preoperative and postoperative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery. Students may choose general, thoracic, cardiac/cardiovascular, oncology, or vascular surgery for specialty rotations.

10.00, Clinical

PAS-592F Orthopedics Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the orthopedic advanced rotation, students will acquire an in-depth knowledge of the care and treatment of patients with musculoskeletal problems. Students will work with individual attending physicians and PAs in various areas of orthopedic practice, such as Joint Reconstructive Service, Foot-Ankle-Hand Service, Sports Medicine Service, Pediatric and Tumor Service, or the Spine Service. Students will work in an office clinic setting, assist in surgery, and round on inpatients. Students are required to attend various clinical and resident education conferences. All students meet weekly with the course director for a student-only education conference. Educational goals include review of functional anatomy, understanding of injury triage, and concepts of treatment. Night call may be required.

10.00, Clinical

PAS-592G Urology Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The

advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the urology advanced rotations, students will gain experience in the diagnosis and management of disorders of the genitourinary system. The discipline crosses both medical and surgical management considerations and emphasis is placed on the recognition of disease and gaining experience across a wide-range of therapeutic modalities.

10.00, Clinical

PAS-592H Interventional Radiology Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the interventional radiology advanced rotation, student will gain familiarity with managing a wide range of disorders using a range of radiographic techniques, including angioplasty, stents, arthroscopy, and thrombolysis. Interventional radiology involves use these techniques to treat disorders in various organs in combination with imaging techniques, such as fluoroscopy, CT, MRI and/or ultrasound.

10.00, Clinical

PAS-592I Neurosurgery Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the neurosurgery advanced rotation, students will gain familiarity with managing a wide range of neurologic disorders using a range of surgical techniques, including shunts, burr holes, and stereotactic techniques. Neurosurgery involves the use of these techniques to treat disorders of the central and peripheral nervous system and the spine, in combination with imaging techniques, such as fluoroscopy, CT and/or MRI.

10.00, Clinical

PAS-592J Geriatrics Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the geriatric advanced rotation, student will gain familiarity with managing a wide range of disorders seen in the geriatric population. Geriatric medicine involves treating all organ systems affected by aging, as well as disorders specific to the elderly patient population- such as polypharmacy, falls, and depression. Care of the geriatric patient is often multidisciplinary, and participation in team activities and care planning is required.

10.00, Clinical

PAS-592K Physical Medicine and Rehabilitation Advanced Clinical Practice III

This three-course sequence consists of nine months of rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus, in one of the following areas of practice: orthopedics, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine, pulmonary and critical care medicine, urology, interventional radiology, neurosurgery, geriatrics, and physical medicine and rehabilitation. The advanced training rotations will generally require a minimum of 40 contact hours per week, and night call will generally be required. For the physical medicine and rehab advanced rotation, student will gain familiarity with managing a wide range of disorders seen in the adult and pediatric rehabilitation population. Rehabilitation medicine involves diagnosis evaluation, and treatment of patients with cognitive and/or physical disabilities, as well as the management of co-morbidities and pain. Care of the PM and R patient is often multidisciplinary, and participation in team activities and care planning is required.

10.00, Clinical

PAS-602 Advanced Leadership for Physician Assistants

This course will provide a critical examination of topics related to PA leadership. The history of various PA professional organizations and the role of leadership in the advancement of the profession will be discussed. Students will engage in research and develop projects to test leadership theories and their impact on future PA leaders and the profession.

4.00, Classroom

PAS-605 Topics in Physician Assistant Practice

This independent study course will provide the student with an opportunity to collaborate with a faculty mentor to select a topic of interest for research analysis and application to PA clinical or professional practice. The scope of the project will be defined by the student under the guidance of the faculty mentor.

3.00, Classroom

PAS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

PCM-505 Physical Diagnosis

Course will begin in the first quarter of the first year and continues for most quarters through the pre-clinical years. The focus of the first year component will be coordinated with the preceptorship experience and will emphasize professional behavior and the normal physical examination. The second year component will be concerned with advanced examination techniques and procedures (such as blood drawing).

1.00, Classroom | Web Component

PCM-505B Physical Diagnosis

Course will begin in the first quarter of the first year and continues for most quarters through the pre-clinical years. The focus of the first year component will be coordinated with the preceptorship experience and will emphasize professional behavior and the normal physical examination. The second year component will be concerned with advanced examination techniques and procedures (such as blood drawing).

1.00, Classroom | Web Component

PCM-514 Interviewing & Communication

This course will begin in the first quarter of the first year and continue through the preclinical years. The focus within this course is on communication skills: the teaching formats will include use of standardized patients, role playing, video-taped histories and direct feedback from both patients and faculty.

1.00, Classroom

PCM-524 Preceptorship IV

This longitudinal experience is designed to provide students an opportunity to observe and interact with physicians and their patients in an outpatient/office setting. This includes visits to the offices of primary care physicians across all six quarters of the preclinical years. First year students are expected to have six such experiences.

1.00, Classroom | Web Component

PCM-525 Preceptorship V

This longitudinal experience is designed to provide students an opportunity to observe and interact with physicians and their patients in an outpatient/office setting. This includes visits to the offices of primary care physicians across all six quarters of the preclinical years. First year students are expected to have six such experiences.

1.00, Classroom | Web Component

PCM-526 Preceptorship VI

This longitudinal experience is designed to provide students an opportunity to observe and interact with physicians and their patients in an outpatient/office setting. This includes visits to the offices of primary care physicians across all six quarters of the preclinical years. First year students are expected to have six such experiences.

1.00, Classroom | Web Component

PED-000 Pediatrics Elective

Students may receive credit for an individually arranged elective with a Rush faculty members. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation 342 and must have written approval from the Assistant Dean of Clinical Education before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

4.00, Clinical

PED-701 Core Clerkship: Pediatrics

The principles and practice of care of the patient from birth through adolescence are studied through direct patient contact. The primary objective is to provide an opportunity for students to become proficient in the clinical basis of pediatric diagnosis.

The clinical facilities of both the inpatient and outpatient services of Rush University Medical Center, John H. Stroger Hospital of Cook County, and private physicians' offices are utilized. Regular conferences, lectures, and case presentations provide additional learning experiences. Students will have an eight-week assignment to pediatrics, which includes rotations in inpatient and ambulatory settings, and the nursery. Ambulatory activities constitute 50% of the clerkship. Night call is approximately every fourth night including weekends.

8.00, Clinical | Web Component

PED-710 Pediatric Subinternship

The subintern will function in a capacity similar to an intern on one of two pediatric ward services. Senior residents and faculty physicians will provide supervision. This experience is only offered to fourth-year students. The students are expected to take call every fourth night. The four-week subinternship rotation is taken during the fourth year. This clerkship will be scheduled during the elective lottery, which takes place in the spring of the M3 year.

4.00, Clinical

PED-711 Pediatric Cardiology

Ambulatory experience can be obtained in the care of children with congenital and acquired heart disease, as well as, assessment of innocent heart murmurs. Clinical history and physical findings are correlated with x-ray, electrocardiographic, echocardiographic, and cardiac catheterization data. Didactic sessions are offered once a week which include learning the interpretation of ECG and chest x-ray.

4.00, Clinical

PED-711X Pediatric Cardiology-Away

Ambulatory experience can be obtained in caring for children with congenital and acquired heart disease, as well as assessment of innocent heart murmurs. Clinical history and physical findings are correlated with x-ray and electrocardiographic echocardiographic, and cardiac catheterization data. Didactic sessions are offered once a week which include learning the interpretation of ECG and chest x-ray. Prerequisite: PED 701.

4.00, Clinical

PED-715 Chronic Diseases in Children

Based at Shriner's Hospital for Crippled Children, students will participate in an active inpatient and outpatient program which provides referral services to children with musculoskeletal disorders, neural tube defects and other chronic diseases.

4.00, Clinical

PED-716 Pediatric Ambulatory Care

This rotation offers students the opportunity to participate in primary care pediatrics in a variety of settings. A hands-on approach with individual attending supervision is emphasized. The student will follow private and clinic patients for both health maintenance and acute and chronic medical problems. Students generate their goals and learning experiences for the rotation. The elective will be geared toward satisfying the student's individual needs and interests. NOTE: Students must attend Pediatric Grand Rounds on Tuesdays (8-9AM).

4.00, Clinical

PED-716X Pediatric Ambulatory Care-Away

This rotation offers students the opportunity to participate in primary care pediatrics in a variety of settings. A hands-on approach with individual attending supervision is emphasized. The student will follow private and clinic patients for both health maintenance and acute and chronic medical problems. Other settings available for student participation include Misericordia (chronic illnesses), the Rush General Care Nursery, and multiple homeless shelters. Students generate their goals and learning experiences for the rotation. The elective will be geared toward satisfying the student's individual needs and interests. Prerequisite: PED 701.

4.00, Clinical

PED-721 Pediatric Endocrinology

This rotation provides students with a problem-oriented approach to pediatric endocrinology. All aspects of pediatric endocrinology are covered but particular emphasis is placed on the outpatient assessment of the normal and abnormal aspects of growth and pubertal development. The elective aims to highlight the role of the primary care provider in the initial evaluation of pediatric patients with a suspected endocrine disorder and to provide the student with an introduction to specialized diagnostic endocrine testing and management of the endocrine patient. The student will be expected to evaluate any inpatient consult which presents during the rotation. The student will be provided up to 8 endocrine case exercises with questions for review, as well as other didactic material, and will be expected to present an endocrine topic researched from the literature for 15-20 minutes at the end of the rotation.

4.00, Clinical

PED-724 Pediatric Intensive Care Unit

The Pediatric Intensive Care course will expose the student to the type of care provided to medical, subspecialty, and surgical pediatrics patients who require higher acuity of care. The student will be part a medical team comprised of residents of varying experience levels. The student will be expected to perform at a sub-intern level with regard to expectations and work requirements. By the

end of the rotation, the student will be expected to learn: 1) The initial evaluation and stabilization of a critically ill patient; 2) pediatric resuscitation techniques; 3) basic ventilator management and 4) procedures such as intubation, and central line placement.

4.00, Clinical

PED-726 Pediatric Nephrology

This rotation will provide the student with experience in the care of children with renal problems in hospital and ambulatory settings. The emphasis in this clerkship is on participation on an active consulting service with concentration on normal and abnormal renal functions, electrolyte imbalances, proteinuria, hematuria, hypertension, urinary tract infections, and developmental diseases of the kidney.

4.00, Clinical

PED-726X Pediatric Nephrology-Away

Experience in the care of children with renal problems in hospitalized and ambulatory patients. Emphasis is on participation on an active consulting service with concentration on normal and abnormal renal functions, electrolyte imbalances, proteinuria, hematuria, hypertension, urinary tract infection and developmental diseases of the kidney. Prerequisite: PED 701.

4.00, Clinical

PED-731 Pediatric Radiology

Students observe radiologic procedures and participate in analyses, reviews and general radiology conferences. Analysis involves assessment of appropriateness of an examination, detection of pertinent findings, interpretation of findings, and synthesis of interpretation and clinical presentation into reasonable diagnoses.

4.00, Clinical

PED-732 Pediatric GI/Nutrition

This clerkship will provide a core set of didactic materials and discussions. Emphasis will be on understanding the pathophysiology of, and basic approach to, common clinical problems.

The nutrition component will include fundamentals of enteral and total parenteral nutrition management. The student will be expected to perform a literature review of one or more topics.

2.00-4.00, Clinical

PED-741 Pediatric Allergy/Immunology

This elective teaches the clinical approach to problems of allergy, other immune-mediated diseases, and immunodeficiency in both children and adults. Diagnosis and treatment of commonly encountered IgE-mediated diseases (allergic rhinitis, asthma, eczema, and urticaria), as well as connective tissue diseases

and immunodeficiency syndromes are explained. Rotators are responsible for following medicine and pediatric inpatient consults at RUMC and Stroger Hospitals and report to the attending physician-on-service for daily rounds. Allergy/Immunology outpatient care is demonstrated at Fantus Clinic (part of the Stroger Hospital Ambulatory Care Network) as well as the Allergy/Immunology Office at Rush Medical Center. Rotators also learn about skin testing techniques, spirometry and immunological tests performed by the Rush Medical Laboratory. Teaching (basic science or clinical lecture, journal club, research and chart review) conferences are held at Rush on Friday mornings. The attending physician-on-service and/or fellow-on-service also teach on daily rounds. A pretest and final quiz are given to measure achievement as a basis for evaluation.

4.00, Clinical

PED-742 Pediatric Hematology/Oncology

This course provides an introduction to the care of children with hematologic disorders and malignancies of childhood. A core lecture series is presented during the elective as well as a review of blood and marrow morphology. Students will participate in the evaluation of new patients as well as established patients. Ward rounds are made daily for inpatients on the service and consultations. Outpatient clinics are held five days a week. Several multi-disciplinary conferences are held weekly. A course syllabus will be provided. Students will complete the elective by taking an oral and written ("open-book") examination.

4.00, Clinical

PED-742X Pediatric Hematology/Oncology-Away

Course provides introduction to the care of children with a variety of hematologic disorders, or malignancies of childhood. A core lecture series is presented as well as a review of blood and marrow morphology. Students participate in the evaluation of new as well as established patients. Ward rounds are made daily for inpatients on the service and consultations. Outpatient clinics are held five days a week. Prerequisite: PED 701.

4.00, Clinical

PED-746 Pediatric Infectious Disease

This elective clerkship focuses on clinical and laboratory evaluation of pediatric infections. An active inpatient consultation service provides ample opportunity for patient evaluation and follow-up. Correct use of laboratory facilities is stressed. Pathophysiology of infectious diseases, differential diagnosis, and antibiotic use are discussed on daily ward rounds and weekly conferences. The student will see outpatients with diagnostic problems as well as attend specialized clinics for children with HIV infection, tuberculosis and congenital toxoplasmosis.

4.00, Clinical

PED-746X Pediatric Infectious Disease-Away

The focus is on clinical and laboratory evaluation of pediatric infections. An active consultation service provides ample opportunity for patient evaluation and follow-up. Correct use of laboratory facilities is stressed. Pathophysiology of infectious diseases, differential diagnosis, and antibiotic use are discussed on daily ward rounds and weekly conferences. Students see outpatients with diagnostic problems and attend specialized clinics for children with HIV infection, tuberculosis and congenital toxoplasmosis. Prerequisite: PED 701.

4.00, Clinical

PED-751 Pediatric Neurology

On this clerkship fourth-year medical students will become acquainted with the broad scope of pediatric neurology with an emphasis on the basic examination of children with neurologic and developmental problems. Basic interpretation of common neurodiagnostic studies in the course of inpatient rounds and outpatient clinics will be emphasized. The student will become familiar with common diagnoses such as epilepsy, migraine, autism, muscular dystrophy, "developmental delay," tics and attention deficit disorder.

4.00, Clinical

PED-772 Pediatric Respiratory Medicine

The objectives for this clerkship are to expose the medical student to all facets of clinical practice involving pediatric patients with respiratory disease.

4.00, Clinical

PED-781 Research in Pediatrics

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00-8.00, Clinical

PED-793 Special Care Nursery

This course is an introduction to the care of sick and premature newborn infants in the intensive care setting with emphasis

on normal sequence of events in the birth-recovery period and disruptions to that sequence and adaptation of the baby during the post-partum period. Care of the most common complications occurring at this age will be emphasized. Visiting students are eligible for four-week rotations only.

2.00-4.00, Clinical

PED-793 Neonatal Intensive Care Unit

This course is an introduction to the care of sick and premature newborn infants in the intensive care setting with emphasis on normal sequence of events in the birth-recovery period and disruptions to that sequence and adaptation of the baby during the post-partum period. Care of the most common complications occurring at this age will be emphasized. Visiting students are eligible for four-week rotations only.

2.00-4.00, Clinical

PED-794 Adolescent & Young Adult Medicine

This course provides direct experience in the care of hospitalized and outpatient adolescents and young adults. Hospitalized patients are seen at Rush University Medical Center. Outpatients are seen at a variety of sites, including the Pediatric Ambulatory Care Center at Rush, the Teen/Family Planning Clinic in Evergreen Park, the Joliet and Chicago Job Corps Center and the Orr High School Clinic.

4.00, Clinical

PED-804 Adolescent & Young Adult Medicine

This course provides experience in outpatient settings, including a hospital-based adolescent clinic, and HIV adolescent specialty clinic, the juvenile detention center, and school-based clinics. In addition, students are required to do short presentations and to participate in didactic sessions and a journal club that is adolescent-focused.

2.00-4.00, Clinical

PED-842 Pediatric Hematology/Oncology

This course provides an introduction to the care of children with hematologic disorders and malignancies of childhood. A core lecture series is presented during the elective as well as a review of blood and marrow morphology. Students will participate in the evaluation of new patients as well as established patients. Ward rounds are made daily for inpatients on the service and consultations. Outpatient clinics are held two days a week. Several multidisciplinary conferences are held weekly. A course syllabus will be provided.

4.00, Clinical

PED-861 Child Abuse and Neglect

Students doing this elective will work one-on-one with the attending physicians in the Division of Child Protective Services

at John H. Stroger Jr. Hospital of Cook County, and will actively participate in the work-up, management, and follow-up care of children suspected of being maltreated. Students can expect to learn medical aspects of Physical Abuse, Sexual Abuse, and Neglect (including Failure to Thrive). Students will also have the opportunity to observe and participate in the developmental evaluations of patients and in the psychosocial evaluations of patients and their families. Students also attend and provide care in the weekly comprehensive follow-up clinic for abused and neglected children, and will also attend the Medical Clinic at the Children's Advocacy Center. In addition to participating in the clinical work-up of suspected abuse/neglect, students will learn about the role of the physician as advocate for the child within the Child Welfare and Legal Systems and will learn about the physician's role in coordinating multidisciplinary care for high risk patients and their families. There is required reading for the elective and students will be expected to attend lectures and present cases during rounds and weekly multidisciplinary patient staffing.

4.00, Clinical

PED-EXM Pediatrics Exam Remediation

Remediation of core Pediatrics exam only.

4.00, Clinical

PED-REM Pediatrics Clinical Remediation

Remediation of Pediatrics clinical weeks only - not required to repeat exam.

4.00, Clinical

PHR-501 Medical Pharmacology I

Introduction to the basic concepts which describe drug actions. The autonomic nervous system and related drug actions, anti-inflammatory drugs, autacoids, neuropharmacology, psychopharmacology, and anesthetic/analgesic pharmacology. Prerequisites: Permission of instructor.

1.00, Classroom | Web Component

PHR-501G Graduate Medical Pharmacology

Introduction to the basic concepts which describe drug actions. The autonomic nervous system and related drug actions, anti-inflammatory drugs, autacoids, neuropharmacology, psychopharmacology, and anesthetic/analgesic pharmacology.

3.00, Classroom

PHR-502 Medical Pharmacology II

Cardiovascular, diuretic and respiratory agents, hypoglycemic agents, drugs acting on the blood and blood-forming organs, toxicology, antibiotics and cancer chemotherapeutic agents.

Prerequisite: PHR-501.

1.00, Classroom | Web Component

PHR-502G Graduate Medical Pharmacology II

Cardiovascular, diuretic and respiratory agents, hypoglycemic agents, drugs acting on the blood and blood-forming organs, toxicology, antibiotics and cancer chemotherapeutic agents.

Prerequisite: PHR-501G

3.00, Classroom | Web Component

PHR-503E Medical Pharmacology III - Exam Makeup

Medical Pharmacology III exam makeup only.

1.00, RMC Exam Makeup

PHR-504 Pharmacology/Physiology I

This course integrates physiology and pharmacology to establish an understanding of drug actions as they relate to human organ system function. Topics include cellular function, immunity and infection, synapse, nerve, muscle, heart and circulation, kidney, respiration, gastrointestinal and urinary function, autonomic nervous system, central nervous system, hormones, and homeostasis and coagulation.

3.00, Classroom | Web Component

PHR-505 Pharmacology/Physiology II

Continuation of topics included in PHR 504.

3.00, Classroom | Web Component

PHR-506 Pharmacology/Physiology III

Continuation of topics included in 504 and 505.

3.00, Classroom | Web Component

PHR-523 Readings in Clinical Research

This course consists of seminars evaluating clinical research studies in the literature. Each seminar will evaluate a clinical study, its attributes, as well as the methodological problems. Many of the studies discussed will have been undertaken by Rush Clinical Investigators and one of the investigators will lead the discussion.

2.00, Classroom

PHR-523B Readings in Clinical Research II

This course consists of seminars evaluating clinical research studies in the literature. Each seminar will evaluate a clinical study, its attributes, as well as the methodological problems. Many of the studies discussed will have been undertaken by Rush Clinical Investigators and one of the investigators will lead the discussion.

2.00, Classroom

PHR-551 Ethics in Biomedical Research & the IRB

This course provides the framework around which clinical research projects are based in terms of the Institutional Review Board. The course includes didactic lectures on the legal

requirements of informed consent, regulatory processes, intellectual property, the role of the office research integrity as well as required participation on IRB review panels inside the University.
2.00, Classroom | Web Component

PHR-552 Introduction to Regulatory Process

Lectures cover drug discovery, the U.S. regulatory process including IND and NDA and clinical trials I through IV. The course also includes lectures on drug metabolism, principles of toxicity, adverse drug reaction reporting, the IRB responsibilities of investigators, biologic and generic drug development, PK/PD modeling, orphan drug development, and medical device approval.
3.00, Classroom

PHR-556 Tools for Research

This course focuses on the practical elements required to work as a scientist in modern times. It includes didactic lecture and computer practice on Power Point, poster making, importing into word documents, Adobe Photoshop, Sigma Plot, Grants.org, on line proposal submission, advanced med-line searches, Excel spreadsheets, and reference managing systems.
2.00, Classroom

PHR-556 Tools for Research

This course focuses on the practical elements required to work as a scientist in modern times. It includes didactic lecture and computer practice on Power Point, poster making, importing into word documents, Adobe Photoshop, Sigma Plot, Grants.org, on line proposal submission, advanced med-line searches, Excel spreadsheets, and reference managing systems.
1.00, Classroom

PHR-559 Readings in Special Populations I

This course covers issues relating in doing clinical research with Special Populations. The course is a seminar discussion of these issues, when research is undertaken in populations of prisoners, the elderly, the mentally retarded, emergency situations, minority groups, as well as other groups considered special populations.
2.00, Classroom

PHR-559B Readings in Special Populations II

This course covers issues relating in doing clinical research with Special Populations. The course is a seminar discussion of these issues, when research is undertaken in populations of prisoners, the elderly, the mentally retarded, emergency situations, minority groups, as well as other groups considered special populations.
1.00, Classroom

PHR-561 Drug Biotransformation/Pharmacogenetics

The various types of biotransformation reactions, including all Phase I and Phase II reactions are discussed in detail. The course

describes in detail the biochemistry of drug inactivation both in the liver and at extrahepatic sites and the effects of genotype on that biotransformation. Additional topics to be discussed include prodrugs and protoxins and special considerations needed when discussing the CNS, other separated compartments (e.g., certain tumors and bladder), and the influence of age, gender, hepatic induction, kidney failure, and genetic phenotypes.

3.00, Classroom | Web Component

PHR-562 Kinetics, Toxicology, Drug Interactions & Poisoning

This course will cover principles of toxicology and in depth special issues relating to drug overdose, heavy metal poisoning, prescription drug side effects, natural and OTC poisoning, as well as their treatment procedures. The role of poison control center triage of cases, ER treatment, suicide management and unique considerations therein, and characteristic toxic profiles of drug classes will be described. Medico-legal issues associated with toxicology will also be discussed.

3.00, Classroom | Web Component

PHR-563 Advanced Concepts in Pharmacology

This course will cover biotransformation, drug activation, pharmacogenetics, kinetics and toxicology.

4.00, Classroom | Web Component

PHR-590 Special Topics in Pharmacology

The course is designed to allow the student flexibility in independently pursuing a particular area of interest. May be taken for one or more terms. Note this course received a letter grade. For a letter grade, a public presentation or literature review is required for evaluation.

1.00-12.00, Classroom

PHR-590 Special Topics in Pharmacology

The course is designed to allow the student flexibility in independently pursuing a particular area of interest. May be taken for one or more terms. Note this course received a letter grade. For a letter grade, a public presentation or literature review is required for evaluation.

1.00-9.00, Classroom

PHR-590B Special Topics in Pharmacology

The course is designed to allow the student flexibility in independently pursuing a particular area of interest. May be taken for one or more terms. [variable hours]

1.00-12.00, Classroom

PHR-593 Introduction to Grantsmanship

This course is designed to provide the practical aspects of proposal submission. In addition to covering basic writing skills, it

addresses specific elements that should be included in each of the various sections of federal grants, foundation applications, and biotech contracts. In addition, it talks about ways of identifying sources for funding, a survey of the NIH landscape and how to prepare budgets. The online submission process is also reviewed.

1.00, Classroom | Web Component

PHR-594 Advanced Receptor Pharmacology

Advanced Receptor Pharmacology course is designed to provide specific information about different classes of receptors with emphasis on how the structure relates to their function, as well as on their downstream signaling. The course also aims to help students understand the pharmacological analyses of the interactions of drugs and drug receptors, the fundamentals of pharmacokinetics, and modern approaches to drug design. The course includes a strong emphasis on reading and discussion of current literature to illustrate the concepts presented.

3.00, Classroom | Web Component

PHR-595 Readings in Pharmacology

This course is designed to allow the student flexibility in independently pursuing a particular area of interest. May be taken for one or more terms. This course is typically an independent study or a Journal Club focused on a particular topic of interest to faculty or student.

1.00-2.00, Classroom

PHR-598 Research in Pharmacology

Laboratory research in an area of interest that will form the basis of a dissertation proposal or a master's thesis. These research hours are taken prior to passage of comprehensive exams. By special arrangement.

1.00-12.00, Laboratory

PHR-598 Research in Pharmacology

Laboratory research in an area of interest that will form the basis of a dissertation proposal or a master's thesis. These research hours are taken prior to passage of comprehensive exams. By special arrangement.

1.00-9.00, Laboratory

PHR-691 Pharmacology Seminar

A pharmacology seminar series featuring speakers from outside and within the department. Students are required to make presentations a minimum of once a year.

1.00, Classroom

PHR-699 Dissertation Research

Laboratory research for the doctoral dissertation for PhD candidates only. By special arrangement.

1.00-12.00, Laboratory

PHR-699 Doctoral Research

Laboratory research for the doctoral dissertation for PhD candidates only. By special arrangement.

1.00-9.00, Laboratory

PHR-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

PHY-501 Medical Physiology I

Comprehensive physiology course dealing with all major or systems except the CNS. Concept formation and problem solving are stressed. Lectures are supplemented by small group discussions and laboratory exercises. Students are expected to discuss assigned study questions in group discussions. Laboratory exercises are divided between conventional experiments and computer simulations of physiological systems.

1.00, Classroom | Web Component

PHY-501E Medical Physiology I - Exam Makeup

Medical Physiology I exam makeup only.

1.00, RMC Exam Makeup

PHY-502 Medical Physiology II

Continuation of PHY 501. Prerequisite: PHY 501.

1.00, Classroom | Web Component

PHY-505 Introductory Membrane Biophysics

Study of fundamental processes involved in movement of ions across membranes, excitability in nerve and muscle, equivalent circuit analysis, artificial membrane systems, structure of membranes, and active transport processes.

4.00, Classroom

PHY-511 Graduate Physiology I

Comprehensive physiology course dealing with all major or systems except the CNS. Concept formation and problem solving are stressed. Lectures are supplemented by small group discussions and laboratory exercises. Students are expected to discuss assigned study questions in group discussions. Laboratory exercises are divided between conventional experiments and

computer simulations of physiological systems.
5.00, Classroom | Web Component

PHY-512 Graduate Physiology II

Continuation of PHY 511. Prerequisite: PHY 511.
5.00, Classroom | Web Component

PHY-590 Special Topics in Physiology

Advanced course dealing with selected topics in physiology.
Particular subjects vary from year to year.
1.00-12.00, Classroom

PHY-590 Special Topics in Physiology

Advanced course dealing with selected topics in physiology.
Particular subjects vary from year to year.
1.00-9.00, Classroom

PHY-598 Introduction to Research

A tutorial course designed to familiarize students with the literature and techniques applicable to modern physiological research.
1.00-12.00, Laboratory

PHY-598 Introduction to Research

A tutorial course designed to familiarize students with the literature and techniques applicable to modern physiological research.
1.00-9.00, Laboratory

PHY-690 Research Topics in Physiology

With a member of the staff, the student participates in a laboratory-based experience in an area of current research. The level of participation depends on the students background and will include examination of the literature, a review of the topics being investigated and opportunities to participate in experimental work. In addition to work in the laboratories, independent experimental or bibliographic projects may be undertaken with the approval of a faculty member. A report is prepared describing the work attempted and accomplished. PF grade
1.00-9.00, Classroom

PHY-699 Thesis Research

Post-candidacy research by arrangement.
1.00-12.00, Laboratory

PHY-699 Doctoral Research

Post-candidacy research by arrangement.
1.00-9.00, Laboratory

PHY-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.
Continuous Enrollment

PMR-781 Research in Physical Medicine & Rehabilitation

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.
4.00, Clinical

PMR-791 Physical Medicine & Rehabilitation

This clerkship will introduce the student to the field of Physical Medicine and Rehabilitation (PM&R). The course will include introduction in the care of patients with disabilities due to strokes, spinal cord injuries, head trauma, amputations, movement disorders, arthroplasties, etc. In addition, the student will be expected to observe, understand, and learn what services are provided by the allied health professional staff, and when it is appropriate to prescribe these services.
2.00-4.00, Clinical

PRF-301 Introduction to Perfusion Technology

The history of the profession as well as the present and future role of the perfusionist will be studied. Aseptic techniques and a survey of cardiopulmonary components will be examined. This course includes both a clinical and lab component where the student will

be introduced to ancillary procedures and extracorporeal circuit set-up.

3.00, Classroom | Web Component

PRF-302 Pathophysiology of Cardiopulmonary Bypass I

Cardiovascular physiology and pathophysiology will be studied. Pathophysiology will include acquired and congenital heart diseases.

5.00, Classroom | Web Component

PRF-303 Pathophysiology of Cardiopulmonary Bypass II

Physiology and pathophysiology relating to the patient undergoing extracorporeal circuit support will be explored. Topics will include gas transfer, acid-base, hemostasis and inflammation.

5.00, Classroom | Web Component

PRF-311 Junior Seminar I

Theory and practice of laboratory analysis, in-line monitors, extracorporeal safety devices and hemodynamic monitoring will be presented. This course includes a lab and clinical component where the student will continue to improve their clinical skills. The clinical component will be reinforced in a discussion format during class time.

3.00, Classroom | Web Component

PRF-312 Junior Seminar II

Special procedures in extracorporeal technology will be explored. The clinical and lab component will consist of patient management during extracorporeal circulatory support and special circuit demonstrations.

5.00, Classroom | Web Component

PRF-313 Junior Seminar III

Special procedures in extracorporeal technology will be explored.

3.00, Classroom | Web Component

PRF-331 Anatomy & Physiology

The purpose of this course is to provide the perfusion student with an overview of specific areas of human anatomy and physiology as a basis for understanding the complex interaction of the open heart surgery patient with the heart-lung machine. Students will develop an understanding of specific body systems to include the cardiovascular and respiratory systems, and the central and autonomic nervous systems.

5.00, Classroom | Web Component

PRF-332 Anatomy & Physiology II

This course is the continuation of PRF-331. The purpose of this course is to give students an overview of renal anatomy and

physiology, and fluid, electrolytes, and acid-base homeostasis as a basis for understanding the interaction of the patient undergoing open heart surgery with the heart-lung machine.

3.00, Classroom | Web Component

PRF-333 Pharmacology

The student will learn the fundamental principles and concepts of pharmacology. Presents the principles of drug absorption, distribution, and metabolism; the concept of drug receptor inaction; and the therapeutic uses and mechanisms of action of prototype drugs in each major drug group, particularly as it applies to the open heart surgical patient before, during and after surgery.

3.00, Classroom

PRF-381 Project Design & Research

Research studies are analyzed and evaluated relative to an identified clinical problem. Includes concepts, methods and strategies inherent to the research process with a focus on design, internal and external validity, sampling, measurement and ethical issues.

3.00, Classroom | Web Component

PRF-431 Clinical Experience I

This series of courses represents the student's clinical experience. Students will rotate through various locations, several of which will be outside of the Chicago area. By the end of the series the student will be able to demonstrate all skills of a competent perfusionist. P/N grading only. SU

10.00, Clinical | Classroom | Web Component

PRF-432 Clinical Experience II

This series of courses represents the student's clinical experience. Students will rotate through various locations, several of which will be outside of the Chicago area. By the end of the series the student will be able to demonstrate all skills of a competent perfusionist. P/N grading only.

10.00, Clinical | Classroom | Web Component

PRF-433 Clinical Experience III

This series of courses represents the student's clinical experience. Students will rotate through various locations, several of which will be outside of the Chicago area. By the end of the series the student will be able to demonstrate all skills of a competent perfusionist. P/N grading only.

10.00, Clinical | Classroom | Web Component

PRF-434 Clinical Experience IV

This series of courses represents the student's clinical experience. Students will rotate through various locations, several of

which will be outside of the Chicago area. By the end of the series the student will be able to demonstrate all skills of a competent perfusionist. P/N grading only.
10.00, Clinical | Classroom | Web Component

PRF-441 Project Design and Research I

In this series of courses the student will complete a research project suitable for submission to a peer-reviewed publication.
SU
2.00, Classroom | Web Component

PRF-442 Project Design and Research II

In this series of courses the student will complete a research project suitable for submission to a peer-reviewed publication.
2.00, Classroom | Web Component

PRF-443 Project Design and Research III

In this series of courses the student will complete a research project suitable for submission to a peer-reviewed publication.
2.00, Classroom | Web Component

PRF-444 Project Design & Research IV

In this series of courses the student will complete a research project suitable for submission to a peer-reviewed publication.
2.00, Classroom | Web Component

PRF-451 Senior Seminar I

In this series of courses advanced topics in extracorporeal technology will be discussed. Due to out-of-town clinical rotations, portions of this course material will be offered online. FA
2.00, Classroom | Web Component

PRF-452 Senior Seminar II

In this series of courses advanced topics in extracorporeal technology will be discussed. Due to out-of-town clinical rotations, portions of this course material will be offered online.
2.00, Classroom | Web Component

PRF-453 Senior Seminar III

In this series of courses advanced topics in extracorporeal technology will be discussed. Due to out-of-town clinical rotations, portions of this course material will be offered online
2.00, Classroom | Web Component

PRF-501 Introduction to Perfusion Technology

The history of the profession as well as the present and future role of the perfusionist will be studied. Aseptic techniques and a survey of cardiopulmonary components will be examined. This course includes both a clinical and lab components where the student will be introduced to ancillary procedures and extracorporeal circuit set-up.
3.00, Classroom | Web Component

PRF-502 Pathophysiology of Cardiopulmonary Bypass I

Cardiovascular physiology and pathophysiology will be studied. Pathophysiology will include acquired and congenital heart diseases.
5.00, Classroom | Web Component

PRF-503 Pathophysiology Cardiopulmonary Bypass II

Physiology and pathophysiology relating to the patient undergoing extracorporeal circuit support will be explored. Topics will include gas transfer, acid-base, hemostasis and inflammatory processes as they relate to the conduct of cardiopulmonary bypass.

5.00, Classroom | Web Component

PRF-510 Seminar I

This seminar will focus on the principles of laboratory analysis with special emphasis on blood chemistry, coagulation/hematology and blood banking. Additionally focus will be placed on the hemodynamic monitoring of patients undergoing cardiovascular surgery.
3.00, Classroom | Web Component

PRF-511 Seminar II

Focus will be on the role of the perfusionist in special operative procedures. This will include issues relating to heart, lung, and liver transplantations, left heart bypass, and conduct of cardiopulmonary bypass.
5.00, Classroom | Web Component

PRF-512 Seminar III

This is a continuation of Seminar II. The focus will continue to be on special procedures. Topics will include extracorporeal membrane oxygenation, antegrade and retrograde cerebral perfusion, sickle cell disease, and perfusion of the pregnant patient
3.00, Classroom | Web Component

PRF-513 Seminar IV

Topics include medical imaging and diagnostic technology, and pressure flow and resistance relationships.
2.00, Classroom | Web Component

PRF-521 Anatomy & Physiology

The purpose of this course is to provide the perfusion student with an overview of specific areas of human anatomy and physiology as a basis for understanding the complex interaction of the open heart surgery patient with the heart-lung machine. Students will develop an understanding of specific body systems to include the cardiovascular and respiratory systems, and the central and autonomic nervous systems.
5.00, Classroom | Web Component

PRF-522 Anatomy & Physiology II

This course is the continuation of PRF-521. The purpose of this course is to give students an overview of renal anatomy and physiology, and fluid, electrolytes, and acid-base homeostasis as a basis for understanding the interaction of the patient undergoing open heart surgery with the heart-lung machine.

3.00, Classroom | Web Component

PRF-523 Pharmacology

Students will learn the fundamental principles and concepts of pharmacology. Discussions will focus on the principles of drug absorption, distribution and metabolism; drug receptor activities, and the therapeutic uses and mechanism of action of drugs in each major drug group.

3.00, Classroom | Web Component

PRF-531 Clinical Experience I

This series of courses represents the student's clinical experience. Students will rotate through various locations several of which will be outside of the Chicago area. By the end of the series, the student will be able to demonstrate all skills of a competent perfusionist.

10.00, Clinical | Classroom | Web Component

PRF-532 Clinical Experience II

This series of courses represents the student's clinical experience. Students will rotate through various locations several of which will be outside of the Chicago area. By the end of the series, the student will be able to demonstrate all skills of a competent perfusionist.

10.00, Clinical | Classroom | Web Component

PRF-533 Clinical Experience III

This series of courses represents the student's clinical experience. Students will rotate through various locations several of which will be outside of the Chicago area. By the end of the series, the student will be able to demonstrate all skills of a competent perfusionist.

10.00, Clinical | Classroom | Web Component

PRF-534 Clinical Experience IV

This series of courses represents the student's clinical experience. Students will rotate through various locations several of which will be outside of the Chicago area. By the end of the series, the student will be able to demonstrate all skills of a competent perfusionist.

10.00, Clinical | Classroom | Web Component

PRF-541 Project Design & Research

In this series of courses students will complete a master's project

which will be submitted for publication in a peer reviewed publication.

3.00, Classroom | Web Component

PRF-542 Project Design/Research & Master's Project

In this series of courses students will complete a master's project which will be submitted for publication in a peer reviewed publication.

2.00, Classroom | Web Component

PRF-543 Master's Project II

In this series of courses students will complete a master's project which will be submitted for publication in a peer reviewed publication.

2.00, Classroom | Online (75% or Greater)

PRF-544 Master's Project III

In this series of courses students will complete a master's project which will be submitted for publication in a peer reviewed publication.

2.00, Classroom | Web Component

PRF-545 Master's Project IV

In this series of courses students will complete a master's project which will be submitted for publication in a peer reviewed publication.

2.00, Classroom | Web Component

PRF-551 Advanced Topics: Cardiac Physiology

Advanced courses dealing with selected topics designed to further the student's knowledge in the fields of management, educational methods, and advanced cardiovascular physiology and pharmacology. The student is expected to develop and present research quality papers which the student will present to faculty and peers.

2.00, Classroom | Web Component

PRF-552 Advance Topics: Educational Methods

Advanced courses dealing with selected topics designed to further the student's knowledge in the fields of management, educational methods, and advanced cardiovascular physiology and pharmacology. The student is expected to develop and present research quality papers which the student will present to faculty and peers.

2.00, Classroom | Web Component

PRF-552 Advanced Topics: Cardiac Pharmacology

Advanced courses dealing with selected topics designed to further the student's knowledge in the fields of management, educational methods and advanced cardiovascular

physiology and pharmacology. The student is expected to develop and present research quality papers, which the student will present to faculty and peers.

2.00, Classroom | Web Component

PRF-553 Advanced Topics: Management

Advanced courses dealing with selected topics designed to further the student's knowledge in the fields of management, educational methods, and advanced cardiovascular physiology and pharmacology. The student is expected to develop and present research quality papers which the student will present to faculty and peers.

2.00, Classroom | Web Component

PRF-554 Advanced Topics: Cardiac Pharmacology

Advanced courses dealing with selected topics designed to further the student's knowledge in the fields of management, educational methods, and advanced cardiovascular physiology and pharmacology. The student is expected to develop and present research quality papers which the student will present to faculty and peers.

2.00, Classroom | Web Component

PRF-554 Advanced Topics: Educational Methods

Advanced courses dealing with selected topics designed to further the student's knowledge in the fields of management, educational methods and advanced cardiovascular physiology and pharmacology. The student is expected to develop and present research quality papers that the student will present to faculty and peers.

2.00, Classroom | Web Component

PRF-601 Pharmacology

In this course, general information about drugs and specific terms used in pharmacology are presented. Factors that affect absorption, distribution, biotransformation, elimination, dose-response relationships, and drug receptors are discussed. Important pharmacological concepts and principles are illustrated through in-depth discussion of select agents from key major drug groups.

4.00, Classroom

PRF-602 Advanced Topics: Cardiovascular Physiology

This course will provide students with the opportunity to combine the didactic knowledge gained in Pathophysiology of Cardiopulmonary Bypass I and II with the clinical application in the laboratory environment. The relationships between heart rate, stroke volume, cardiac output, peripheral vascular resistance, mean arterial pressure, central venous pressures, and pulsatility of the vascular system will be explored.

3.00, Classroom

PRF-603 Advanced Topics: Educational Methods

This course will focus on helping students develop a knowledge base on the principles of adult learning. Through the understanding of self learning/teaching styles, students will be able to facilitate adult learning in the classroom and clinical arena, and provide leadership to subordinates in the workplace.

3.00, Classroom | Web Component

PRF-604 Advanced Topics: Management

This course will provide students with organizational and leadership skills to enable them to assume positions with managerial responsibilities, such as the management of perfusion departments. Students will prepare and analyze case studies and discuss the skills needed to integrate clinical and managerial skills in the workplace.

3.00, Independent Study

PRF-605 Advanced Topics: Cardiac Pharmacology

This course will build on the basic principles of

3.00, Classroom

PRF-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study

PRF-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

Continuous Enrollment

PSY-501 Introduction to Psychopathology

A study of the range of psychopathology that will be manifested in clinical situations. By reviewing diagnostic criteria and by studying etiological factors underlying various forms of psychopathology that range from disturbances in cellular and neurotransmitter function through psychological and social stresses, students develop a basic understanding of common psychiatric conditions.

1.00, Classroom | Web Component

PSY-501E Introduction to Psychopathology - Exam Makeup

Introduction to Psychopathology exam makeup only.
1.00, RMC Exam Makeup

PSY-701 Core Clerkship: Psychiatry

The core psychiatry clerkship provides basic medical and didactic exposure to the major psychiatric disorders focusing on their diagnosis and management. Emphasis is placed on aspects of psychiatry relevant to the primary practitioner with a holistic approach to patient care, recognizing the significant biological, psychological, and social/environmental factors contributing to the patient's illness. Systems concepts of care are presented in an integrated manner through graded, intensive clinical experiences. Inpatient settings employed for assignment of patient responsibility include general adult, intensive adult, consultation-liaison services, and clinical research. Outpatient settings include Stroger Hospital, and clinical research at the Treatment Research Center at Rush.

4.00, Clinical | Web Component

PSY-783 Research in Psychiatry

The student will be exposed to basic clinical psychiatric research and be involved with patients with a wide spectrum of psychiatric disorders. Most of the research is based on using medical treatment that is investigational. The objectives of this clerkship are to become familiar with basic clinical research, including use of psychiatric rating scales, and basic research design.

4.00, Clinical

PSY-792 Psychosomatic Medicine

This elective is designed for senior students interested in the internal medicine/psychiatry residency or psychiatry in a consultation/liaison setting. Adults hospitalized on medical, surgical, obstetric, and neurological services are studied with supervised diagnostic evaluation and continuing management. Integration of medical, psychological, and family issues are emphasized, including the role of the milieu-home, community, and hospital. Special work is done with dialysis patients, transplant patients, patients with malignancy, and those undergoing intensive care. The elective is planned as an experience in all areas, with emphasis depending upon student interest and needs. Those interested in the combined internal medicine/psychiatry residency may choose to have additional experiences to acquaint them with the residency and this combined approach to patient care. Students may also enroll in this clerkship for six weeks by contacting the Office of Medical Student Programs.

4.00-6.00, Clinical

PSY-793 Child Psychiatry

Students will work with the treatment teams of the 4 Kellogg Child Psychiatric Inpatient Unit, the Rush Therapeutic Day School, the Medication Clinic, a residential treatment center for emotionally and behaviorally disturbed students and outpatient services for children and adolescents. The student will attend seminars in child development, psychopathology, psychopharmacology and therapeutic modalities. The student will participate in multidisciplinary staffing's case conferences, departmental grand rounds and the journal club. Optional experience in school consultation at a therapeutic school for autistic children, and forensic consultant at the Juvenile Detention Center is available. Students will be supervised by faculty members and child psychiatry fellows.

4.00, Clinical

PSY-794 Adult Psychiatry

The objective of this elective is to increase the student's knowledge of various psychiatric disorders and to improve knowledge and skills in drug therapy, individual psychotherapy, family therapy, and group therapy. Emphasis is placed on crisis management and brief therapy in inpatient settings (open unit-13 Kellogg, closed unit-12 Kellogg).

4.00, Clinical

PSY-795 Geriatric Psychiatry

Objectives of this rotation are: to increase the amount of experience in treating elderly patients with psychiatric diagnostic skills, and the use of psychotherapy and pharmacotherapy with elderly patients; to learn the psychological changes that accompany the aging process; and to become familiar with normal and abnormal states and processes in the elderly. These objectives are accomplished via: 1) readings in the field of Geriatric Psychiatry, and 2) direct treatment of selected patients with supervision by attending psychiatrists, fellows and residents.

4.00, Clinical

PSY-7EI Psychiatry Elective

Students may receive credit for an individually arranged elective with a Rush faculty members. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Curriculum before beginning the rotation.

Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.
4.00, Clinical

PSY-EXM Psychiatry Exam Remediation

Remediation of core Psychiatry examination only.
4.00, Clinical

PSY-REM Psychiatry Clinical Remediation

Remediation of core psychiatry clinical weeks only - student not required to repeat examination.
4.00, Clinical

PTH-511 Systemic Pathology I

Basic systemized study of human diseases affecting the various organ systems presented in lectures, seminars, and laboratory sessions. Concepts covered in PTH 500 will be stressed and correlated with the special pathology of organ systems and their functional and structural alterations. Fundamentals of laboratory testing presented with emphasis placed on interpretation of tests and the appropriateness of test ordering. Students learn to draw blood and will be expected to perform and interpret a few simple, but diagnostically important, laboratory tests such as urinalysis, hemacrit, and blood smear. No examinations are given in this course, but attendance is required.
1.00, Class & Lab | Web Component

PTH-512 Systemic Pathology II

Basic systemized study of human diseases affecting the various organ systems presented in lectures, seminars, and laboratory sessions. Concepts covered in PTH-500 will be stressed and correlated with the special pathology of organ systems and their functional and structural alterations. Fundamentals of laboratory testing presented with emphasis placed on interpretation of tests and the appropriateness of test ordering. Students learn to draw blood and will be expected to perform and interpret a few simple, but diagnostically important, laboratory tests such as urinalysis, hemacrit, and blood smear. No examinations are given in this course, but attendance is required.
1.00, Classroom | Web Component

PTH-513 Systemic Pathology III

Basic systemized study of human diseases affecting the various organ systems presented in lectures, seminars, and laboratory sessions. Concepts covered in PTH-500 will be stressed and correlated with the special pathology of organ systems and their functional and structural alterations. Fundamentals of laboratory testing presented with emphasis placed on interpretation of tests and the appropriateness of test ordering. Students learn

to draw blood and will be expected to perform and interpret a few simple, but diagnostically important, laboratory tests such as urinalysis, hemacrit, and blood smear. No examinations are given in this course, but attendance is required.
1.00, Classroom | Web Component

PTH-513E Systemic Pathology III - Exam Makeup

Systemic Pathology III exam makeup only.
1.00, RMC Exam Makeup

PTH-781 Research in Pathology

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.
4.00, Clinical

PTH-791 Pathology Clerkship

This elective is aimed at students who are considering post-graduate training in Pathology, and students who desire to enhance and complement their knowledge of general pathology. During the 4-6-week elective, the student will get to appreciate what training in pathology is all about, and realize that there are many aspects in this intriguing field. For the past several years there has been a positive transformation in the field which has awakened the interest of medical students, physicians, and the community-at-large. Pathologists more than ever are perceived as critical members of the healthcare team. The student will have hands-on experience in the techniques of grossing specimens in surgical pathology, molecular diagnostic techniques, image analyses, and clinical laboratory procedures. The student is encouraged to get involved in the performance of autopsies, including weekends, if so desired. On their last day of the elective, the students are expected to prepare a 20-minute presentation to the department on a topic mutually agreed upon with the Course Director. The students will have intimate contact with the residents and attending staff. Their activities will be supervised by the Course Director on a regular

basis. The student's evaluations will be completed based on the input of residents and attendings with whom the student worked.

4.00, Clinical

PTH-791X Pathology-Away

Aimed at students considering post-graduate training in pathology, and students who desire to enhance and complement their knowledge of general pathology. The elective may be tailored to focus on student's specialty interests, if other than general pathology. Students will have hands on experience in techniques of grossing specimens in surgical pathology, molecular diagnostic techniques, image analyses, and clinical laboratory procedures. Students are encouraged to be involved in performance of autopsies, including weekends, if desired. This service usually requires 10 to 20 percent of the student's time in the elective. Students will have intimate contact with residents and attending staff. Prerequisites: MED 701.

4.00-6.00, Clinical

PTH-7EI Pathology Individualized Elective

Students may receive credit for individually arranged activities with Rush faculty members, outside faculty personal, private physicians or researchers, or persons in medically related field such as medical historians, ethicists, attorneys, and medical journalists. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, specific dates of the rotation and that the student will not receive any monetary compensation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Director of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

4.00, Clinical

PVM-505 Epidemiology/Biostatistics

The purpose of this review course is to provide students with a working knowledge of key concepts in epidemiology and biostatistics. These concepts, presented as 'important terms' in each lecture hour, have been selected based upon their coverage on the USMLE Board exam. Thus, this course will serve as a preparation for this exam. The course is team taught in a lecture format by epidemiologists and biostatisticians from the Departments of Preventive Medicine, Medicine, and Psychiatry. An assigned textbook that covers the key concepts is highly

recommended; lecture handouts are provided.

1.00, Classroom | Web Component

PVM-546 Principles of Biostatistics I

Covers statistical issues in clinical trial design. This includes blinding, randomization, bias, and intent to treat. Use of descriptive statistics and graphical techniques to explore patterns in data. A review of the basic properties of probability and the characteristics of the normal and binomial distributions. One and two sample inference and hypothesis testing for proportions, means and medians, one way analysis of variance and simple linear regression including diagnostics based on residuals and confidence intervals for regression coefficients are covered. Hypotheses testing for cross-classified data are also discussed.

3.00, Classroom

PVM-547 Principles of Biostatistics II

Covers multifactor analysis of variance, multiple regression, logistic regression including Hosmer-Lemeshow goodness-of-fit and receiver-operating curves. Survival analysis including log rank tests, Kaplan-Meier curves and Cox regression are covered. Additionally, statistical software packages such as SAS or SPSS are discussed.

3.00, Classroom | Web Component

PVM-553 Observational Epidemiology

Course will provide an in-depth description of case-control and cohort studies. This includes: the different types (e.g. hospital- or population-based controls, retrospective and prospective cohorts, nested case-control), their strengths, weaknesses and uses, the definition and selection of cases and controls, matching and sampling, the definition and selection of exposure and comparison groups, the ascertainment of disease status and exposure status, and issues in analysis and interpretation of data, including the role of bias (selection bias, confounding bias, recall bias, misclassification of disease and exposure status), the effect of non-participation and loss to follow-up, and the application of various analytic approaches (stratification, standardization, and multivariate models). The computation, interpretation and application of basic epidemiologic concepts and statistics will be reinforced throughout the course, including measures of disease frequency (prevalence, incidence, attack rate) and measures of association (relative risk, odds ratio, risk difference, population attributable risk). Landmark studies illustrating the different types of case-control and cohort studies will be described. Trainees will be assigned readings from basic epidemiologic texts as well as publications from major case-control and cohort studies.

1.00, Classroom

PVM-557 Clinical Trial Design I

Presents an overview of all types of trial designs including large simple trials, randomized double blinded trials, crossover studies and others. The course applies concepts obtained in Basic and Observational Epidemiology courses to address how studies are set up to answer specific research questions. The course reviews experimental designs in the context of specific hypotheses, bias, and confounding. Publications from existing peer-review journals will be used to illustrate various trial designs.

3.00, Classroom

PVM-558 Clinical Trial Design II

This course focuses on practical application of the concepts learned in Clinical Trial Design I. Trainees will be expected to design various types of clinical trials e.g. multicenter, double blind, placebo controlled studies as well as large simple trials and describe rationale for blinding, methods of randomization and planned analysis. Issues of data interpretation will be covered.

3.00, Classroom

PVM-559 Research -Special Populations

The material in this course will concentrate on public health and research issues in African-Americans, women, Hispanics and children. Issues that are accentuated include: barriers for recruitment of patients into clinical trials, role of the 'Cooandero' in aiding with protocol compliance and recruitment, influence of culture on disease processes, influence of environment and genetic predisposition for common disorders such as diabetes, hypertension, cancer and cardiovascular disease.

2.00, Classroom

PVM-593 Grants Workshop

The course builds on Tools for Research. The aim of this course is to teach the trainee how to organize and highlight the most important parts of a grant proposal. The course emphasizes writing style, consistency and integration of thought. All aspects of an NIH proposal are emphasized including the genesis of the budget and budget justification. P/N grading for clinical research students. Letter grade available for other majors.

1.00, Classroom

PVM-593 Introduction to Grantsmanship

The course builds on Tools for Research. The aim of this course is to teach the trainee how to organize and highlight the most important parts of a grant proposal. The course emphasizes writing style, consistency and integration of thought. All aspects of an NIH proposal are emphasized including the genesis of the budget and budget justification. P/N grading for clinical research

students. Letter grade available for other majors. P/N grading only.
1.00, Classroom

PVM-597 Clinical Thesis Research

For trainees doing thesis research or writing. Prerequisite: Consent of the trainee's advisor; and acceptance of the thesis topic and preliminary thesis outline by the thesis committee. A minimum of 6 hours is required. P/N grading only.

1.00-12.00, Classroom

PVM-721 Infectious Diseases & Public Health

Students will become oriented to infectious diseases public health work by joining the State Epidemiologist's daily activities including outbreak investigation. When an outbreak is not occurring, the student will be involved in an assigned brief research project oriented to review of medical literature and presentation of their findings for critical review by the State Epidemiologist or an analytic project involving a database of cases of a reportable infectious disease such as typhoid fever or meningococcal meningitis. The remainder of time will be spent with field trips (e.g., county TB clinic, restaurant inspections with a sanitarian, tour of state laboratory or Quarantine Station at O'Hare Airport). Lectures on various topics will be provided (e.g., West Nile Virus in Illinois, epidemiology of pertussis, and Outbreak Investigations of many diseases). Specific educational objectives are: 1) to gain basic understanding of public health infectious disease issues; 2) to expose medical students to career opportunities in public health; and 3) to develop an understanding of the local, state, and federal role in surveillance and control of infectious diseases.

2.00, Clinical

PVM-781 Research in Preventive Medicine

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

PVM-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study

PVM-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

RAD-711 Interventional Radiology

This clinical clerkship exposes the student to interventional radiology with emphasis on patient care. Both non-vascular as well as vascular interventional examinations are performed on inpatients as well as outpatients. Students will have assigned readings and will be able to attend lectures given by the Diagnostic Radiology attending staff and residents included under the Diagnostic Radiology clerkship.

4.00, Clinical

RAD-712 Correlative Imaging

This clerkship exposes the student to ultrasound, computed tomography, and magnetic resonance imaging with emphasis on correlation of radiologic findings. Students will be assigned reading and spend time in each of the various imaging sections in the Radiology Department working with the radiology attending physicians and resident physicians.

4.00, Clinical

RAD-721 Radiation Oncology

The student will participate in the normal activities of the department including consultations, treatment planning, and follow-up care of cancer patients. The student will be assigned to multiple services, allowing exposure to different cancer sites.

2.00-4.00, Clinical

RAD-781 Research in Radiology

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person

to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

RAD-781X Research in Radiology-Away

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year.

4.00, Clinical

RAD-791 Diagnostic Radiology

Basic radiologic principles are demonstrated, and the role of the diagnostic radiologist in the clinical setting of general patient care, and medical and surgical specialty consultations is emphasized. Each student prepares one case for the teaching file and gives one oral presentation. Students have assigned readings to complete, and are tested by a written final examination. Students are also urged to attend the two daily departmental teaching conferences.

4.00, Clinical

RAD-791X Diagnostic Radiology-Away

Basic radiologic principles are demonstrated and the role of diagnostic radiology as a clinical setting for patient care and medical and surgical specialty consultations is emphasized. Students prepare one case for the teaching file and gives one oral presentation. Students are assigned readings, teaching tapes to review, and are tested by a written final examination. A special lecture series designed specifically for the students, with lectures and unknown cases, presented by the diagnostic radiology attending staff and residents. Students are also urged to attend the two daily departmental teaching conferences. A minimum of four students any four week rotation. Approval of

course director required to drop course within eight weeks of start of rotation. Not offered in June, July, November, December or January.

4.00, Clinical

RAD-796 Nuclear Medicine

All facets of the disciplines of nuclear medicine are studied, with particular emphasis on radionuclide scanning of organ systems for diagnostic and research purposes. Emphasis is on patho-physiologic correlation and case study. Literature review and individual topics are encouraged to provide in-depth study in the broad field of nuclear medicine.

2.00, Clinical

RAD-7EI Diagnostic Radiology Individualized Elective

Students may receive credit for individually arranged activities with Rush faculty members, outside faculty personal, private physicians or researchers, or persons in medically related field such as medical historians, ethicists, attorneys, and medical journalists. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, specific dates of the rotation and that the student will not receive any monetary compensation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Director of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

4.00, Clinical

RC-311 Introduction to Respiratory Care

Provides students with an introduction to the field of respiratory care. Historical development of the professions, the principles

of chemistry and physics as they apply to respiratory care, cardiopulmonary anatomy and physiology as well as respiratory care procedures are covered. Specific modes of respiratory care are examined to understand the indications, hazards, contraindications and evaluation of therapy. Modes of care include medical gases, humidity/aerosol therapy, aerosol medications, positive pressure breathing, incentive spirometry, expiratory resistance, postural drainage and percussion/vibration. Prerequisite: Admission to the program.

5.00, Classroom | Web Component

RC-312 Cardiopulmonary Physiology

Provides an in-depth study of cardiopulmonary anatomy and physiology. Topics include the function of the respiratory system, ventilatory mechanics, gas transport in the blood, natural and chemical regulation of breathing, circulation, blood flow and pressure, and cardiac output. The heart-lung relationship, clinical applications of respiratory care and common disorders will be emphasized.

5.00, Classroom | Web Component

RC-313 Respiratory Equipment & Techniques

Provides students with hands-on experience with respiratory care equipment in a laboratory setting. Students select, assemble, and check equipment for proper function, operation and cleanliness. Equipment malfunctions and actions to correct malfunctions will also be covered. Equipment will include oxygen delivery devices, humidifiers, aerosol generators, pressure ventilators, gas delivery, metering and analyzing devices, percussors, vibrators, environmental devices, manometers and gauges and vacuum systems. Basic and advanced life support will be covered to include cardiopulmonary resuscitation, artificial ventilation and circulation, endotracheal intubation, airway care, recognition and treatment of arrhythmias, and cardiovascular pharmacology. Related equipment will also be reviewed to include manual resuscitators, artificial airways, defibrillators and cardiac monitors. Prerequisite: Admission to the program.

5.00, Classroom | Web Component

RC-321 Patient Assessment

Fundamentals of cardiopulmonary assessment will be covered to include review of existing data in the patient record, patient history, physical examination, oximetry, blood gases, respiratory monitoring, pulmonary function assessment, laboratory studies, chest and upper airway radiographs, ventilation/perfusion scans, bedside EKG interpretation, cardiovascular monitoring, and nutritional assessment.

5.00, Class & Lab | Web Component

RC-322 Pulmonary Disease

Topics include the etiology, pathophysiology, diagnosis, treatment and prognosis of common pulmonary diseases and conditions. Management of non-respiratory disorders commonly encountered in the critical care unit will also be covered. Pulmonary and critical care medicine, obstructive and restrictive pulmonary disease, neoplastic disease of the lung, disordered breathing, cardiac and cardiovascular disorders, neurologic and neuromuscular disorders, shock, trauma, sepsis, near drowning, burns, smoke inhalation, carbon monoxide poisoning, drug overdose, renal failure, acute G.I. disturbances, and respiratory care of the post-operative patient will be reviewed.

5.00, Classroom | Web Component

RC-323 Mechanical Ventilation

Provides instruction in the theory, set-up, operation and maintenance of mechanical ventilators and related equipment. Topics include: mechanical ventilator theory, ventilator operation, ventilator maintenance and trouble shooting. Maintenance of artificial airways, fiberoptic bronchoscopy, thoracentesis, chest tube maintenance, and arterial blood gas sampling will also be discussed related to the critical care patient.

4.00, Classroom | Laboratory | Web Component

RC-324 Pharmacology

Introduces the physiologic and pharmacologic basis of cardiopulmonary medications. Preparation, calculation of dosages and mixtures and general principles of pharmacology will be covered followed by an in-depth discussion of bronchoactive drugs, and drug groups related to the cardiopulmonary system such as neuromuscular blocking agents, central nervous system depressants, cardiovascular agents, and diuretics. Prerequisite: Admission to the program.

3.00, Classroom | Web Component

RC-331 Critical Respiratory Care

Instruction on all phases of adult critical care and continuous mechanical ventilation is provided. The history of mechanical ventilation, modes of mechanical ventilatory support, implementation, monitoring, ventilator weaning and discontinuance will be covered. Advanced critical care techniques for invasive and non-invasive patient monitoring will be covered. Hemodynamic monitoring will include arterial pressure monitoring, central venous and pulmonary artery catheters, and cardiac output measurement. Non-invasive monitoring techniques including oximetry, transcutaneous monitoring, inductance plethysmography, capnography, and metabolic testing are included.

5.00, Classroom | Web Component

RC-332 Cardiopulmonary Diagnostics & Pulmonary Function Testing

An overview of the various areas comprising cardiopulmonary diagnostics to include normal and abnormal pulmonary function and related technology. The student will learn to perform, interpret, and evaluate pulmonary function studies. In addition, the student will learn the operation and maintenance of pulmonary function and gas analysis equipment. Other topics include sleep laboratory, stress and exercise testing, metabolic testing, ventilation/perfusion scanning, cardiac catheterization laboratory, and non-invasive cardiology.

5.00, Classroom | Laboratory | Web Component

RC-333 Pediatric & Neonatal Respiratory Care

The processes of growth and development relating to respiratory care from the fetus to the adolescent will be discussed. Topics include: fetal growth and development, neonatal growth and development, fetal assessment, fetal evaluation, neonatal assessment, neonatal evaluation, neonatal respiratory care, neonatal pathology, pediatric pathology and pediatric respiratory care, to include critical care and mechanical ventilation.

5.00, Classroom | Laboratory | Web Component

RC-334 Clinical Observation I

Students will observe respiratory care procedures in general medical and surgical floors, intensive care units, the emergency department and in pediatric units.

2.00, Clinical | Web Component

RC-401 Education

An introduction to basic principles and techniques used in respiratory care education. Topics include: patient education, inservice education, course design, objectives, lesson plan development, learning activities, use of media, development of presentations, testing and evaluation. Credit at the graduate level requires completion of a course project. Prerequisites: Admission to program.

5.00, Classroom | Web Component

RC-402 Management

Management principles and problems as they relate to respiratory care and the management of the department, hospital, service organization, and health care programs will be discussed. Credit at the graduate level requires completion of a course project. Prerequisite: Admission to program.

5.00, Classroom | Web Component

RC-403 Introduction to Research

An introduction to the methods of scientific research to include research design and statistical analysis. Critical review of the components of research reports will be performed to include definition of the problem, review of the literature, research design, data analysis and results. Prerequisite: Admission to program.

5.00, Classroom | Web Component

RC-404 Clinical Observation II

Students will observe respiratory care procedures in general medical and surgical floors, intensive care units, the emergency department and in pediatric units.

2.00, Clinical | Web Component

RC-411 Clinical Practice I

Introduces students to clinical respiratory care procedures. Topics include: introduction to the clinical affiliate, patient assessment, medical gas therapy, aerosol therapy, incentive spirometry, positive pressure breathing, chest physiotherapy and airway care using nasal, endotracheal, and tracheal tubes. Critical respiratory care is introduced to include basic care as applied in the intensive care unit. In addition, ventilator monitoring, arterial puncture and blood gas analysis, endotracheal intubation, EKG services, and bronchoscopy observation are introduced. Prerequisites: Satisfactory completion of first year course work. 12.00, Clinical | Classroom | Web Component

RC-412 Clinical Seminar I

Case presentations are required to integrate clinical and theory. Review of respiratory care with an emphasis on problem solving and decision making. Practice board credentialing examinations will be administered for CRT examination preparation. Current issues relevant to respiratory care will be explored to include new trends in management, new treatments and technologies, ethical issues in health care, and issues related to professional development and practice. Prerequisite: Second year status. 3.00, Classroom | Web Component

RC-413 Research Project I

Guided activities to develop an appropriate research question and research methodology for completion of the required research requirements. Prerequisite: Second year status. 2.00, Classroom | Web Component

RC-421 Clinical Practice II

This course provides students the opportunity to further develop skills required in the intensive care of the respiratory patient. Topics include: initiation of mechanical ventilation, patient stabilization and monitoring, measurement and evaluation of hemodynamic variables, bronchial hygiene, evaluation for weaning, extubation, arterial line samples, and non-invasive monitoring. Students will rotate through bronchoscopy services and the O.R. for endotracheal intubation. 12.00, Clinical | Web Component

RC-422 Clinical Seminar II

Case presentations are required to integrate clinical and theory. Review of respiratory care as it pertains to the registry (RRT) credentialing examinations administered by the National Board for Respiratory Care (NBRC). A series of simulation examinations will be used to prepare the students for these exams. Emphasis will be placed on decision-making and problem-solving as they relate to clinical respiratory care. Current issues relevant to the cardiopulmonary sciences and respiratory care will be explored

and issues and trends in health care will be discussed. Successful completion of the National Board for Respiratory Care (NBRC) certification examination is required in order to meet course requirements. Prerequisite: Second year status. 3.00, Classroom | Web Component

RC-423 Research Project II

Guided activities to develop an appropriate research question and research methodology and begin data collection for completion of the required program research requirements. Prerequisite: Second year status. 2.00, Classroom | Web Component

RC-431 Clinical Practice III

An opportunity to acquire clinical experience is provided in perinatal and pediatric respiratory care in the areas of patient assessment and monitoring (invasive and non-invasive), basic care, mechanical ventilation ECMO, airway care, and labor and delivery assistance and transport. Also covered in the Pulmonary Function Laboratory are arterial and blood gas analysis, measurement of lung volumes and capacities, flow volume loops, diffusion testing and body plethysmography. Students will also have an opportunity for in-depth application and reinforcement of adult intensive care. Specialty rotations in polysomnography, cardiac catheter lab, endotracheal integration, pulmonary rehabilitation, bronchoscopy, and exercise testing will be included. In addition, students are provided with the opportunity for the development of an area of specialization. Prerequisites: RC-421. 12.00, Clinical | Web Component

RC-431A Clinical Practice III Part A

The purpose of this clinical practice will be to allow the student to acquire special clinical skills and/or expertise which is not normally achieved in an associate's degree program or through work experience. The student may also use this course to refine or upgrade clinical skills which may have been used infrequently due to the nature of their work environment or experiences. A course proposal or prospectus for clinical practice will be designed by the student and submitted to the Director of Clinical Education. The prospectus or proposal must be reviewed and approved by the Committee on Progress and Promotion for Respiratory Care. With the program director's permission this 12 hour course (RC 591) may be divided into two parts RC 591 A (6 hours) and RC 591 B (6 hours) accomplishing the same course goals outlined above over two terms. 6.00, Clinical | Web Component

RC-431B Clinical Practice III Part B

The purpose of this clinical practice will be to allow the student to acquire special clinical skills and/or expertise which is not

normally achieved in an associate's degree program or through work experience. The student may also use this course to refine or upgrade clinical skills which may have been used infrequently due to the nature of their work environment or experiences. A course proposal or prospectus for clinical practice will be designed by the student and submitted to the Director of Clinical Education. The prospectus or proposal must be reviewed and approved by the Committee on Progress and Promotion for Respiratory Care. With the program director's permission this 12 hour course (RC 591) may be divided into two parts RC 591 A (6 hours) and RC 591 B (6 hours) accomplishing the same course goals outlined above over two terms.

6.00, Clinical | Web Component

RC-432 Clinical Seminar III

Case presentations are required to integrate clinical and theory. Review of respiratory care as it pertains to the credentialing examinations administered by the National Board for Respiratory Care (NBRC). Practice examinations will be used to prepare the students for these exams. Emphasis will be placed on decision-making and problem-solving as they relate to clinical respiratory care. Current issues and trends relevant to the cardiopulmonary sciences and respiratory care will be explored. Successful completion of the National Board for Respiratory Care (NBRC) registry examinations are required in order to meet course requirements. Prerequisite: Second year status

3.00, Classroom | Web Component

RC-433 Research Project III

Guided activities to develop an appropriate research question and research methodology and begin data collection for completion of the required program research requirements.

Prerequisite: Second year status

2.00, Classroom | Web Component

RC-511 Introduction to Respiratory Care

Provides students with the principles of chemistry and physics as they apply to respiratory care, as well as respiratory care procedures. Specific modes of respiratory care are examined to understand principles of application to patients, indications, hazards, contraindications and evaluation of therapy. Modes of care include medical gases, humidity/aerosol therapy, aerosol medications, positive pressure breathing, incentive spirometry, expiratory resistance, postural drainage and percussion/vibration. Prerequisite: Admission to the program.

5.00, Classroom | Web Component

RC-512 Cardiopulmonary Physiology

Provides an in-depth study of cardiac and pulmonary anatomy and physiology, as well as the diagnostic procedures commonly

used in the hospital to evaluate these systems. Topics include the function of the respiratory system, ventilatory mechanics, gas transport in the blood, natural and chemical regulation of breathing, circulation, blood flow and pressure, and cardiac output. The heart-lung relationship and clinical applications of these phenomena in the cardiopulmonary system will be emphasized.

Prerequisite: Admission to the program.

5.00, Classroom | Web Component

RC-513 Respiratory Equipment & Techniques

Provides students with the opportunity to gain hands-on experience with respiratory care equipment. Students select, assemble, and check equipment for proper function, operation and cleanliness. Equipment malfunctions and actions to correct malfunctions will also be covered. Equipment will include oxygen delivery devices, humidifiers, aerosol generators, pressure ventilators, gas delivery, metering and analyzing devices, percussors, vibrators, environmental devices, manometers and gauges and vacuum systems. Basic and advanced life support will be covered to include cardiopulmonary resuscitation, artificial ventilation and circulation, endotracheal intubation, airway care, recognition and treatment of arrhythmias, and cardiovascular pharmacology. Related equipment will also be reviewed to include manual resuscitators, artificial airways, defibrillators and cardiac monitors. Prerequisite: Admission to the program.

5.00, Classroom | Web Component

RC-521 Patient Assessment

Fundamentals of respiratory assessment will be covered to include review of existing data in the patient record, patient history, physical examination, oximetry, blood gases, respiratory monitoring, pulmonary function assessment, laboratory studies, chest and upper airway radiographs, ventilation/perfusion scans, bedside EKG interpretation, cardiovascular monitoring, and nutritional assessment.

5.00, Class & Lab | Web Component

RC-522 Pulmonary Medicine

Topics include the etiology, pathophysiology, diagnosis, treatment and prognosis of common pulmonary diseases and conditions. Respiratory care management of non-respiratory disorders commonly encountered in the critical care unit will also be covered. Pulmonary and critical care medicine, obstructive and restrictive pulmonary disease, neoplastic disease of the lung, disordered breathing, cardiac and cardiovascular disorders, neurologic and neuromuscular disorders, shock, trauma, sepsis, near drowning, burns, smoke inhalation, carbon monoxide poisoning, drug overdose, renal failure, acute G.I. disturbances, and respiratory care of the post-operative patient will be reviewed.

5.00, Classroom | Web Component

RC-523 Mechanical Ventilation

Provides instruction in the theory, set-up, operation and maintenance of mechanical ventilators and related equipment. Topics include: mechanical ventilator theory, ventilator operation, ventilator maintenance and trouble shooting. Maintenance of artificial airways, fiberoptic bronchoscopy, thoracentesis, chest tube maintenance, and arterial blood gas sampling will also be discussed related to the critical care patient.

4.00, Classroom | Laboratory | Web Component

RC-524 Pharmacology

Introduces the physiologic and pharmacologic basis of pulmonary and cardiac medications. Students will study the preparation, as well as the calculation of dosages and mixtures. General principles of pharmacology as a basis for an in-depth discussion of bronchoactive drugs, and drug groups related to the cardiopulmonary system such as neuromuscular blocking agents, central nervous system depressants, cardiovascular agents, and diuretics will be included. Prerequisite: Admission to the program.

3.00, Classroom | Web Component

RC-531 Critical Respiratory Care

Instruction on all phases of adult critical care and continuous mechanical ventilation is provided. The history of mechanical ventilation, modes of mechanical ventilatory support, implementation, monitoring, ventilator weaning and discontinuance will be covered. Advanced critical care techniques for invasive and non-invasive patient monitoring will be covered. Hemodynamic monitoring will include arterial pressure monitoring, central venous and pulmonary artery catheters, and cardiac output measurement. Non-invasive monitoring techniques including oximetry, transcutaneous monitoring, inductance plethysmography, capnography, and metabolic testing are included.

5.00, Classroom | Web Component

RC-532 Cardiopulmonary Diagnostics & Pulmonary Function Testing

An overview of the various areas comprising cardiopulmonary diagnostics to include normal and abnormal pulmonary function and related technology. The student will be given the opportunity to learn how to perform, interpret, and evaluate various pulmonary function studies. In addition, the student will learn the operation and maintenance of pulmonary function and gas analysis equipment. Other topics include sleep laboratory, stress and exercise testing, metabolic testing, ventilation/perfusion scanning, cardiac catheterization laboratory, and non-invasive cardiology.

5.00, Classroom | Laboratory | Web Component

RC-533 Pediatric & Neonatal Respiratory Care

The processes of growth and development relating to respiratory care from the fetus to the adolescent will be discussed. Relates physiologic function to respiratory care including assessment, evaluation, and treatment. Topics include: fetal growth and development, neonatal growth and development, fetal assessment, fetal evaluation, neonatal assessment, neonatal evaluation, neonatal respiratory care, neonatal pathology, pediatric pathology and pediatric respiratory care.

5.00, Classroom | Laboratory | Web Component

RC-534 Clinical Observation I

Students will observe respiratory care procedures in general medical and surgical floors, intensive care units, the emergency department and in pediatric units.

2.00, Clinical | Web Component

RC-561 Education

An introduction to basic principles and techniques used in respiratory care education. Topics include: patient education, inservice education, course design, objectives, lesson plan development, learning activities, use of media, development of presentations, testing and evaluation. Credit at the graduate level requires completion of a course project. Prerequisites: Admission to program.

5.00, Classroom | Web Component

RC-562 Management

Management principles and problems as they relate to respiratory care and the management of the department, hospital, service organization, and health care programs will be discussed. Credit at the graduate level requires completion of a course project. Prerequisite: Admission to program.

5.00, Classroom | Web Component

RC-563 Introduction to Research

An introduction to the methods of scientific research to include research design and statistical analysis. Critical review of the components of research reports will be performed to include definition of the problem, review of the literature, research design, data analysis and results. Prerequisite: Admission to program.

5.00, Classroom | Web Component

RC-564 Clinical Observation II

Students will observe respiratory care procedures in general medical and surgical floors, intensive care units, the emergency department and in pediatric units.

2.00, Clinical | Web Component

RC-571 Clinical Practice I

Introduces students to clinical respiratory care procedures. Topics include: introduction to the clinical affiliate, patient assessment, medical gas therapy, aerosol therapy, incentive spirometry, positive pressure breathing, chest physiotherapy and airway care using nasal, endotracheal, and tracheal tubes. Critical respiratory care is introduced to include basic care as applied in the intensive care unit. In addition, ventilator monitoring, arterial puncture and blood gas analysis, endotracheal intubation, EKG services, and bronchoscopy observation are introduced. Prerequisites: Satisfactory completion of first year course work.
12.00, Clinical | Classroom | Web Component

RC-572 Clinical Seminar I

Case presentations are required to integrate clinical and theory. Review of respiratory care with an emphasis on problem solving and decision making. Practice board credentialing examinations will be administered for CRT examination preparation. Current issues relevant to respiratory care will be explored to include new trends in management, new treatments and technologies, ethical issues in health care, and issues related to professional development and practice. Prerequisite: Second year status.
3.00, Classroom | Web Component

RC-573 Research Project I

Guided activities to develop an appropriate research question and research methodology for completion of the required research requirements. Prerequisite: Second year status.
2.00, Classroom | Web Component

RC-581 Clinical Practice II

This course provides students the opportunity to further develop skills required in the intensive care of the respiratory patient. Topics include: initiation of mechanical ventilation, patient stabilization and monitoring, measurement and evaluation of hemodynamic variables, bronchial hygiene, evaluation for weaning, extubation, arterial line samples, and non-invasive monitoring.
12.00, Clinical | Web Component

RC-582 Clinical Seminar II

Case presentations are required to integrate clinical and theory. Review of respiratory care as it pertains to the registry (RRT) credentialing examinations administered by the National Board for Respiratory Care (NBRC). A series of simulation examinations will be used to prepare the students for these exams. Emphasis will be placed on decision-making and problem-solving as they relate to clinical respiratory care. Current issues relevant to the cardiopulmonary sciences and respiratory care will be explored and issues and trends in health care will be discussed. Successful completion of the National Board for Respiratory Care (NBRC)

certification examination is required in order to meet course requirements. Prerequisite: Second year status.
3.00, Classroom | Web Component

RC-583 Research Project II

Guided activities to develop an appropriate research question and research methodology and begin data collection for completion of the required program research requirements. Prerequisite: Second year status.
2.00, Classroom | Web Component

RC-591 Clinical Practice III

An opportunity to acquire clinical experience is provided in perinatal and pediatric respiratory care in the areas of patient assessment and monitoring (invasive and non-invasive), basic care, mechanical ventilation, ECMO, airway care, and labor and delivery assistance and transport. Also covered in the Pulmonary Function Laboratory are arterial and blood gas analysis, measurement of lung volumes and capacities, flow volume loops, diffusion testing and body plethysmography. Students will also have an opportunity for in-depth application and reinforcement of adult intensive care. In addition, students are provided with the opportunity for the development of an area of specialization.
12.00, Clinical | Web Component

RC-591A Clinical Practice III Part A

The purpose of this clinical practice will be to allow the student to acquire special clinical skills and/or expertise which is not normally achieved in an associate's degree program or through work experience. The student may also use this course to refine or upgrade clinical skills which may have been used infrequently due to the nature of their work environment or experiences. A course proposal or prospectus for clinical practice will be designed by the student and submitted to the Director of Clinical Education. The prospectus or proposal must be reviewed and approved by the Committee on Progress and Promotion for Respiratory Care. With the program director's permission this 12 hour course (RC 591) may be divided into two parts RC 591 A (6 hours) and RC 591 B (6 hours) accomplishing the same course goals outlined above over two terms.
6.00, Clinical | Web Component

RC-591B Clinical Practice III Part B

The purpose of this clinical practice will be to allow the student to acquire special clinical skills and/or expertise which is not normally achieved in an associate's degree program or through work experience. The student may also use this course to refine or upgrade clinical skills which may have been used infrequently due to the nature of their work environment or experiences. A course proposal or prospectus for clinical practice will be

designed by the student and submitted to the Director of Clinical Education. The prospectus or proposal must be reviewed and approved by the Committee on Progress and Promotion for Respiratory Care. With the program director's permission this 12 hour course (RC 591) may be divided into two parts RC 591 A (6 hours) and RC 591 B (6 hours) accomplishing the same course goals outlined above over two terms.

6.00, Clinical | Web Component

RC-592 Clinical Seminar III

Case presentations are required to integrate clinical and theory. Review of respiratory care as it pertains to the credentialing examinations administered by the National Board for Respiratory Care (NBRC). Practice examinations will be used to prepare the students for these exams. Emphasis will be placed on decision-making and problem-solving as they relate to clinical respiratory care. Current issues and trends relevant to the cardiopulmonary sciences and respiratory care will be explored. Successful completion of the National Board for Respiratory Care (NBRC) registry examinations are required in order to meet course requirements. Prerequisite: Second year status.

3.00, Classroom | Web Component

RC-593 Research Project III

Guided activities to develop an appropriate research question, research methodology, completion of data collection and analysis for completion of the required program research requirements. Prerequisite: Second year status.

2.00, Classroom | Web Component

RC-601 Issues & Trends in Respiratory Care

Current issues relevant to the cardiopulmonary sciences and respiratory care will be explored. Health care delivery systems, new trends in education, organization and management, new treatments and technologies, ethical issues in health care, as well as issues related to professional development and practice will be discussed.

3.00, Classroom

RC-602 Advanced Critical Care Medicine

Advanced topics in critical care medicine will be discussed using an evidence-based practice approach. Diagnostic techniques, patient assessment and monitoring and special procedures in the ICU will be discussed. Readings, projects and writing assignments will include advanced life support, protocol based care, artificial ventilation and circulation, airway care, and recognition and treatment of cardiac, pulmonary, circulatory, renal, hepatic and neurological disorders in the critical care unit.

4.00, Classroom

RC-603 Advanced Cardiopulmonary Diagnostics

Advanced cardiopulmonary diagnostics and related technology will be discussed. The assessment skills needed to evaluate the patient's condition from clinical observations, laboratory tests and imaging studies will be reviewed. Advanced pulmonary function, stress and exercise testing, sleep laboratory, metabolic testing, advanced imaging techniques, and invasive and noninvasive cardiac testing will be described.

3.00, Classroom | Web Component

RC-604 Advance Neonatal and Pediatric Respiratory Care

Advanced topics in neonatal and pediatric respiratory care will be discussed using an evidence-based approach. Patient assessment, evaluation, and treatment will be reviewed. Topics will include: fetal assessment, neonatal assessment, neonatal respiratory care, neonatal pathology, pediatric pathology and pediatric respiratory care.

3.00, Classroom

RC-605 Disease Management

Provides an in depth discussion of the concepts, procedures, and techniques used in the care of patients with acute and chronic cardiopulmonary disorders. The development and implementation of disease management programs for patients with asthma, COPD, and other chronic conditions is presented. Pulmonary rehabilitation, patient education, and smoking cessation programs are reviewed. Assessment and care plan development in the ambulatory and acute care settings is described, to include diagnosis and treatment of common disorders.

3.00, Classroom

RC-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

RMC-516 Central Nervous System/Special

This course integrates information and topics between Anatomy, Histology, Neurology and Neurobiology. Neurology and Neurobiology topics will draw on knowledge in the traditional domains of physiology, biochemistry, pharmacology, and clinical

Neurology. This block is a survey of the Nervous system with highlights of the pertinent head and neck gross anatomy. The block integrates the structure, function, and organization of nervous tissue from the cellular through gross anatomic aspects including central, peripheral and autonomic portions of the system. The lead cases for this block are headache and weakness. Beyond an understanding of the normal structure and function of these systems, students will study the development and growth of these components as well as the changes noted in maturation and ageing processes within these systems. Control mechanisms will be considered as the study during this block moves into the specific clinical scenarios. The basic knowledge of the structure and function of the components of the nervous system will then be applied to the abnormal functions that are the basis for disorders and diseases of this system. The block objectives below were developed by the faculty and represent the content of this block. Individual learning objectives for each lecture as well as for the lab and small group sessions are contained within the educational materials for these sessions. In order to successfully complete this block, students should be able to: review aspects of neuronal structure and function presented in other blocks and describe aspects of PNS and CNS microstructure; explain basic cellular physiologic mechanisms of resting potential, nerve conduction, synaptic function and actions of the major neurotransmitters; describe the topographic anatomy of the brain and brainstem emphasizing regional functions and blood supply: including cranial nerve origin and peripheral distribution; describe the anatomy and function of the spinal cord and brainstem; describe the anatomy and function of each of the major neural systems as noted in the block guide; correlate the flow of information with the anatomical structure in each major neural system as noted in the block guide; explain the anatomical, electrophysiological and neurological basis for higher order eurobehavioral functions, noting how each of these might be evaluated in a clinical setting; correlate localization of focal, multifocal or disseminated lesions with the appropriate signs and symptoms and neurologic testing methods; describe the nature of pathophysiologic lesions in the peripheral and central nervous systems; correlate dysfunction with a specific neural system and the lesion location; identify structures in the head and neck and correlate their function in normal and clinical scenarios as discussed in lecture and lab; describe diseases of the central nervous system that localize to the cortex, subcortical region, brainstem, and spinal cord as discussed in lecture and workshops in this block.

1.00, Classroom

RMC-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the

curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00, Independent Study

RMD-501 Physicianship Program I

The 2-year Physicianship Program is an patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors so they are prepared for full-time clinical duties beginning with their 3rd-year core clerkships where students practice physician skills in the context of patient care. The Physicianship Program is competence-based and aligned with national recommendations. M1Year.

1.00, Classroom | Web Component

RMD-501E Physicianship I - Exam Makeup

Physicianship I exam makeup only.

1.00, RMC Exam Makeup

RMD-501R Physicianship I - Remediation

Physicianship I remediation only.

1.00, RMC Remediation

RMD-502 Physicianship Program II

The 2-year Physicianship Program is an patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors so they are prepared for full-time clinical duties beginning with their 3rd-year core clerkships where students practice physician skills in the context of patient care. The Physicianship Program is competence-based and aligned with national recommendations. M1Year.

1.00, Classroom | Web Component

RMD-503 Physicianship Program III

The 2-year Physicianship Program is an patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors so they are prepared for full-time clinical duties beginning with their 3rd-year core clerkships where students practice physician skills in the context of patient care. The Physicianship Program is competence-based and aligned with national recommendations. M1Year.

1.00, Classroom | Web Component

RMD-503E Physicianship III-Exam Makeup

Physicianship III exam makeup only.

1.00, RMC Exam Makeup

RMD-503R Physicianship III-Remediation

Physicianship III remediation only.
1.00, RMC Remediation

RMD-504 Physicianship Program IV

The 2-year Physicianship Program is an patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors so they are prepared for full-time clinical duties beginning with their 3rd-year core clerkships where students practice physician skills in the context of patient care. The Physicianship Program is competence-based and aligned with national recommendations. M2 Year. FA
1.00, Classroom | Web Component

RMD-505 Physicianship Program V

The 2-year Physicianship Program is an patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors so they are prepared for full-time clinical duties beginning with their 3rd-year core clerkships where students practice physician skills in the context of patient care. The Physicianship Program is competence-based and aligned with national recommendations. M2 Year. WI
1.00, Classroom | Web Component

RMD-506 Physicianship Program VI

The 2-year Physicianship Program is an patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors so they are prepared for full-time clinical duties beginning with their 3rd-year core clerkships where students practice physician skills in the context of patient care. The Physicianship Program is competence-based and aligned with national recommendations. M2 Year. SP
1.00, Classroom | Web Component

RMD-506R Physicianship VI-Remediation

Physicianship VI remediation only.
1.00, RMC Remediation

RMD-510 Cell and Molecular Biology Block

This 4 week course is entitled Cellular and Molecular Biology and is designed to introduce the student to the Rush Medical College Block Curriculum with material integrated between Physiology, Anatomy, Histology and Biochemistry. This block will focus on cellular organization and mechanisms by which cells regulate and balance their physiology through membrane transport, intracellular signal transduction and gene regulation. This

basic knowledge of the cellular and molecular biology of normal cells will then be applied to the abnormal functions that are the basis of human diseases.

1.00, Classroom | Web Component

RMD-510E Cell and Molecular Biology Block-Exam Makeup

Cell and Molecular Biology Block exam makeup only.
1.00, RMC Exam Makeup

RMD-511 Immunology and Hematology Block

This course is a survey of the cell and molecular mechanisms that comprise the function of the immune system, the structure of the immune system organs and tissues, the cellular and molecular components of blood and their functions. Topics will focus on hematopoiesis, specific and non-specific defense mechanisms, inflammation, immunodeficiency, hypersensitivity, serology, tumor and transplantation immunology, vaccines, serum proteins and homeostasis.

1.00, Classroom | Web Component

RMD-511E Immunology and Hematology Block - Exam Makeup

Immunology and Hematology Block exam makeup only.
1.00, RMC Exam Makeup

RMD-512 Musculoskeletal Block

This course is a survey of the musculoskeletal system. The block integrates the structure, function, and organization of muscle, bone and connective tissues with an emphasis on the Spinal fracture case and the Osteoarthritis case. Students will engage in thinking about the development of these systems as well as the changes noted in maturation and ageing processes. Control mechanisms (neural, humoral and mechanical) will be considered as the study during this block moves into the specific clinical scenarios.

1.00, Classroom | Web Component

RMD-512E Musculoskeletal Block - Exam Makeup

Musculoskeletal Block exam makeup only.
1.00, RMC Exam Makeup

RMD-513 Cardiovascular Pulmonary Block

This course is a survey of the normal development, structure and function of the cardiovascular system and respiratory system, including the heart, blood vessels, lungs, trachea and larynx. In addition the course will cover the organization and structure of the thoracic wall.

1.00, Classroom | Web Component

RMD-513 Cardiovascular Respiratory Block

This course is a survey of the normal development, structure and function of the cardiovascular system and respiratory system, including the heart, blood vessels, lungs, trachea and larynx. In addition the course will cover the organization and structure of the thoracic wall.

1.00, Classroom | Web Component

RMD-513E Cardiovascular Respiratory Block-Exam Makeup

Cardiovascular Respiratory Block examination makeup only.

1.00, RMC Exam Makeup

RMD-514 Gastrointestinal and Metabolism Block

This course is a survey of the normal gross and microscopic anatomy and physiology of the digestive system and also a survey of intermediary metabolism including basic carbohydrate, amino acid and lipid metabolism. This course material will be applied to the understanding of a limited number of disease states related to dysfunction of organs of the digestive system or digestive system function.

1.00, Classroom | Web Component

RMD-514E Gastrointestinal and Metabolism Block-Exam Makeup

Gastrointestinal and Metabolism Block exam makeup only.

1.00, RMC Exam Makeup

RMD-515 Genitourinary Block

This course is a survey of the normal development, structure and function and regulation of the organs of the urinary system, female reproductive system and male reproductive system, including the anatomic organization of the structures that form the pelvis and pelvic floor.

1.00, Classroom | Web Component

RMD-515E Genitourinary Block-Exam Makeup

Genitourinary Block exam makeup only.

1.00, RMC Exam Makeup

RMD-516 Central Nervous System/Special Senses

This course is a survey of the normal development, structure and function of the central nervous system including the special senses. This basic knowledge is integrated across several disciplines and will serve as the foundation for the study of abnormal function presented in the selected clinical scenarios in this block. As a requirement of this block the student will review information presented in other blocks related to organization and function of the Autonomic and Peripheral nervous systems. The student will learn to use strategies for localization of lesions

based on patient presentation, case history, signs and symptoms elicited from the neurological exam as well as results seen in imaging and electrophysiological studies.

1.00, Classroom | Web Component

RMD-516 Nervous System Head and Neck Block

This course is entitled Nervous System/Head and Neck Block and is designed to integrate information and topics between Anatomy, Histology and Neurobiology. Neurobiology topics will draw on knowledge in the traditional domains of physiology, biochemistry, pharmacology, and Neurology. Anatomy topics will cover details of head and neck anatomy including cranio-facial anatomy, carotid circulation, the oral cavity, pharynx and larynx, with a particular focus on cranial nerves. This block is a survey of the Nervous system. The block integrates the structure, function, and organization of nervous tissue from the cellular through gross anatomic aspects including central, peripheral and autonomic portions of the system. The block will provide an emphasis on the headache case and the weakness case. Beyond an understanding of the normal structure and function of these systems, students will study the development and growth of these components as well as the changes noted in maturation and ageing processes within these systems. Control mechanisms will be considered as the study during this block moves into the specific clinical scenarios. The basic knowledge of the structure and function of the components of the nervous system will then be applied to the abnormal functions that are the basis for disorders and diseases of this system. The block objectives below were developed by the faculty and represent the content of this block. Individual learning objectives for each lecture as well as for the lab and small group sessions are contained within the educational materials for these sessions.

1.00, Classroom | Web Component

RMD-516E Central Nervous System/Special Senses - Exam Makeup

Central Nervous System/Special Senses exam makeup only.

1.00, RMC Exam Makeup

RMD-516E Nervous System Head and Neck Block Exam Makeup

Nervous System Head and Neck Block exam makeup only.

1.00, RMC Exam Makeup

RMD-517 M1 Capstone Program

The Capstone Program culminates the M1 year incorporating principals from the Basic Science Blocks through case-based teaching. Students are required to participate and complete the program to order to progress to the M2 year. Completion will include attendance at all scheduled sessions and submission

of all assignments. Active participation in scheduled sessions is expected.

1.00, Classroom | Web Component

RMD-517 Capstone I

The Capstone Project is a self-directed, longitudinal activity that will commence during the M1 year and culminate in a presentation during the M4 year. During the M1 year, each medical student will identify a main theme they are interested in investigating throughout medical school. Students will be responsible for developing topics related to their theme. Students will work with a faculty advisor and will submit documentation to the faculty member who will provide advice, feedback and mentoring. Themes can be re-shaped if the student's interests or career goals change. Students will identify topic-related learning objectives that correspond to their current course work.

1.00, Online Only

RMD-518 Capstone II

Continuation of RMD 517. During the second term of the M1 year students will be responsible for identifying and completing learning objectives for each topic that was identified that relates to their theme.

1.00, Online (75% or Greater)

RMD-519 Capstone III

Continuation of RMD 518. Students will continue to develop topics related to their chosen theme. For each topic, the student will identify and complete their learning objectives. Students will work with a faculty advisor who will monitor each the student portfolio and ensure each student has completed required work.

1.00, Classroom | Web Component

RMD-520 Capstone IV

The Capstone Project is a self-directed, longitudinal activity that will commence during the M1 year and culminate in a presentation during the M4 yr. At the conclusion of medical school, each RMC student will be the "Rush Medical College Expert" on their specific topic. The Capstone Project will be an asset to the students for their residency application. Rush will support students who opt to publish their project with their faculty mentor. Potential publication types include case reports, book chapters, abstracts, and research papers. Annually Rush Medical College (RMC) will update the projects list and share with students and faculty. Completion of the Capstone Project will be a requirement for graduation from Rush Medical College. During the M1 year, each medical student will identify a main theme they are interested in investigating throughout medical school. Each year, RMC students will be responsible for developing topics related to their theme. For each topic, the student will identify and

complete their learning objectives. The students will work with a faculty advisor and will submit documentation to the faculty member who will provide advice, feedback and mentoring. Themes can be re-shaped learning objectives that correspond to their current course work. Students will build their Capstone project throughout their medical school education and increase their expertise in the subject. If a student chooses, the Capstone Project may mirror and enhance research interests or active research projects. Once the program is up and running, Rush medical students upper classmen will help advise their junior classmates. PF

1.00, Classroom

RMD-523 Mechanisms of Disease

An overview of the basic mechanisms of the disease process and pharmacological principles.

1.00, Classroom | Web Component

RMD-523E Mechanisms of Disease-Exam Makeup

Mechanisms of Disease exam makeup only.

1.00, RMC Exam Makeup

RMD-524 Diseases Cardiovascular & Respiratory Systems

An overview of the pathology, pathophysiology and microbiological aspects of diseases of the cardiovascular and respiratory system, their diagnosis and treatment

1.00, Classroom | Web Component

RMD-524E Diseases Cardiovascular & Respiratory Systems-Exam Makeup

Diseases Cardiovascular & Respiratory Systems exam makeup only.

1.00, RMC Exam Makeup

RMD-525 Diseases: Genitourinary Systems

An overview of the pathology, pathophysiology and microbiological aspects of diseases of the genitourinary systems, their diagnosis and treatment.

1.00, Classroom | Web Component

RMD-526 Diseases: Central Nervous Systems

An overview of the pathology, pathophysiology and microbiological aspects of diseases of the central nervous system, their diagnosis and treatment.

1.00, Classroom | Web Component

RMD-526E Diseases: Central Nervous Systems - Exam Makeup

Diseases: Central Nervous Systems exam makeup only.

1.00, RMC Exam Makeup

RMD-527 Gastrointestinal, Liver & Metabolic Disease

This course is a survey of the pathology, pathophysiology and pharmacology that related to diseases of the gastrointestinal system and liver, including: identification of alterations in physiology of the gastrointestinal system and the liver and how these manifest clinically; recognition of the significance of symptoms, signs and ancillary data in the evaluation of GI/metabolic disease; description of the pathology of liver and gastrointestinal system; construction of differential diagnosis for common presenting symptoms and physical exam findings of GI, liver and metabolic disease.

1.00, Classroom | Web Component

RMD-527E Gastrointestinal, Liver & Metabolic Disease-Exam Makeup

Gastrointestinal, Liver & Metabolic Disease exam makeup only.
1.00, RMC Exam Makeup

RMD-528 Hematology, Dermatology & Musculoskeletal Disease

This course is a survey of the pathology, pathophysiology and pharmacology that related to diseases of the skin, blood and musculoskeletal system, including: identification of alterations in physiology of the skin, blood, and musculoskeletal systems, and how these manifest clinically; recognition of the significance of symptoms, signs and ancillary data in the evaluation of skin, blood and musculoskeletal disease; description of the pathology of the skin, blood, and musculoskeletal system; description of the mechanism of action of drugs used to treat disorders in the skin, blood, and musculoskeletal systems; construction of differential diagnosis for common presenting symptoms and physical exam findings of diseases of the skin, blood, and musculoskeletal systems.

1.00, Classroom | Web Component

RMD-528E Hematology, Dermatology & Musculoskeletal Disease-Exam Makeup

Hematology, Dermatology & Musculoskeletal Disease exam makeup only.
1.00, RMC Exam Makeup

RMD-529 Evidence-Based Medicine

This course is designed to develop the skills to retrieve (from electronic databases and other resources), manage, and utilize biomedical information for solving problems and making decisions that are relevant to the care of individuals and populations. More specifically, the objectives of this course are to teach the construction of a structured clinical question to address a clinical problem, efficient and effective searching for information, critical appraisal of the evidence and to fully

understanding the results (e.g. understanding the impact of a new therapy when expressed as an odds ratio for development of a negative outcome).

1.00, Classroom | Web Component

RMD-529A Evidence-Based Medicine

In this course, we aim for the students to be able to compare and contrast the methodologies used to establish the scientific basis for evidence-based practice (EBP). This foundation will allow them to achieve broader EBP objectives during their clinical years.

1.00, Classroom | Web Component

RMD-529B Evidence-Based Medicine

In this course, we aim for the students to be able to compare and contrast the methodologies used to establish the scientific basis for evidence-based practice (EBP). This foundation will allow them to achieve broader EBP objectives during their clinical years.

1.00, Classroom | Web Component

RMD-531 Physicianship I

The 2-year Physicianship Program is a patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors, and prepare students for full-time clinical duties beginning with their 3rd-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations.

1.00, Classroom | Web Component

RMD-532 Physicianship II

The 2-year Physicianship Program is a patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors, and prepare students for full-time clinical duties beginning with their 3rd-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations.

1.00, Classroom | Web Component

RMD-533 Physicianship III

The 2-year Physicianship Program is a patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors, and prepare students for full-time clinical duties beginning with their 3rd-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations.

1.00, Classroom | Web Component

RMD-534 Physicianship IV

The 2-year Physicianship Program is a patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors, and prepare students for full-time clinical duties beginning with their 3rd-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations.

1.00, Classroom | Web Component

RMD-540 Humanities in Medicine I

This half of a two-term elective is an 18-session course that examines how empathy, observation and interpretation impact one's experience of literature and the arts. Particular attention will be paid to the ways in which observation and engagement with the arts parallels observation and engagement in patient care. Individual sessions will focus on the role of temporal and professional perspective in describing medical events, differences and similarities in observational skills in the arts, and medicine and the use of movement and drama exercises to examine how one experiences and is experienced by others. Course activities will include museum visits, movement activities, acting exercises, and reading and writing about selected works of literature.

1.00, Classroom | Web Component

RMD-541 Humanities in Medicine II

This half of a two term elective is an 18 session course that examines how empathy, observation and interpretation impact one's experience of literature and the arts. Particular attention will be paid to the ways in which observation and engagement with the arts parallels observation and engagement in patient care. Individual sessions will focus on the role of temporal and professional perspective in describing medical events, differences and similarities in observational skills in the arts and medicine and the use of movement and drama exercises to examine how one experiences and is experienced by others. Course activities will include museum visits, movement activities, acting exercises and reading and writing about selected works of literature.

1.00, Classroom | Web Component

RMD-542 Medical Spanish

The primary goal of the Spanish for Medical Professionals Course is to make it possible for students to communicate in Spanish with patients whose dominant language is Spanish. The best way to learn a language is to practice as often as possible. From the onset of this course, students are encouraged to use their Spanish language skills in class in situations similar to those they may encounter in a medical environment with

Spanish speaking patients. There are in-class activities, such as role-playing, brief conversations, interviewing, and history taking. Students also expand their Spanish vocabulary with an emphasis on medical terminology. The students review the essentials of Spanish grammar to enhance their ability to communicate. Furthermore, the course includes informal presentations about different aspects of Hispanic culture to both enhance the quality of the relationship with Spanish-speaking patients and to avoid misunderstandings about certain cultural values and expectations. By familiarizing students with conversational Spanish and medical Spanish, this course will enable students to apply their learning to real-world situations, to assist with communications, and ultimately to break down the barriers between doctors and patients. This course also includes a series of cultural extracurricular activities and Spanish language websites for students to practice Spanish independently outside of the classroom. By visiting museums, restaurants and attending Hispanic movie sessions, students will be able to engage in Spanish learning activities between classroom sessions. Students will be able to utilize the internet educational resources to fit their individual learning styles, and to complement their in-class instruction and their particular medical interests.

1.00, Classroom | Web Component

RMD-545 Sonographic Anatomy I

The course will enhance student's understanding of key preclinical anatomy and physiology concepts through introducing students to living normal sonographic anatomy and physiology, clinically relevant pathophysiologic conditions, and common ultrasound guided clinical procedures. Topics will be presented in parallel with the Rush M1 anatomy curriculum. We will utilize a monthly to biweekly, interactive, hands-on workshop review of (1) normal anatomy and physiology: direct sonographic visualization of anatomic structures and real-time physiology on normal paid human models, (2) abnormal anatomy and pathophysiology: sonographic visualization of pathologic conditions through the use of a portable ultrasound simulator and review of actual clinical case images, (3) ultrasound guided clinical procedures: performance of common ultrasound guided clinical procedures on cadaver and simulation models.

1.00, Laboratory | Web Component

RMD-546 Sonographic Anatomy II

The course will enhance student's understanding of key preclinical anatomy and physiology concepts through introducing students to living normal sonographic anatomy and physiology, clinically relevant pathophysiologic conditions, and common ultrasound guided clinical procedures. Topics will be presented in parallel with the Rush M1 anatomy curriculum. We will utilize a monthly to biweekly, interactive, hands-on workshop review of (1) normal anatomy and physiology: direct sonographic visualization of

anatomic structures and real-time physiology on normal paid human models, (2) abnormal anatomy and pathophysiology: sonographic visualization of pathologic conditions through the use of a portable ultrasound simulator and review of actual clinical case images, (3) ultrasound guided clinical procedures: performance of common ultrasound guided clinical procedures on cadaver and simulation models.

1.00, Laboratory

RMD-550 Capstone V

The Capstone Project is a self-directed, longitudinal activity that will commence during the M1 year and culminate in a presentation during the M4 year. During the M1 year, each medical student will identify a main theme they are interested in investigating throughout medical school. Students will be responsible for developing topics related to their theme. Students will work with a faculty advisor and will submit documentation to the faculty member who will provide advice, feedback and mentoring. Themes can be re-shaped if the student's interests or career goals change. Students will identify topic-related learning objectives that correspond to their current course work.

1.00, Online Only

RMD-551 Capstone VI

The Capstone Project is a self-directed, longitudinal activity that will commence during the M1 year and culminate in a presentation during the M4 year. During the M1 year, each medical student will identify a main theme they are interested in investigating throughout medical school. Students will be responsible for developing topics related to their theme. Students will work with a faculty advisor and will submit documentation to the faculty member who will provide advice, feedback and mentoring. Themes can be re-shaped if the student's interests or career goals change. Students will identify topic-related learning objectives that correspond to their current course work.

1.00, Online Only

RMD-552 Capstone VII

The Capstone Project is a self-directed, longitudinal activity that will commence during the M1 year and culminate in a presentation during the M4 year. During the M1 year, each medical student will identify a main theme they are interested in investigating throughout medical school. Students will be responsible for developing topics related to their theme. Students will work with a faculty advisor and will submit documentation to the faculty member who will provide advice, feedback and mentoring. Themes can be re-shaped if the student's interests or career goals change. Students will identify topic-related learning objectives that correspond to their current course work.

1.00, Online Only

RMD-553 Capstone VIII

The Capstone Project is a self-directed, longitudinal activity that will commence during the M1 year and culminate in a presentation during the M4 year. During the M1 year, each medical student will identify a main theme they are interested in investigating throughout medical school. Students will be responsible for developing topics related to their theme. Students will work with a faculty advisor and will submit documentation to the faculty member who will provide advice, feedback and mentoring. Themes can be re-shaped if the student's interests or career goals change. Students will identify topic-related learning objectives that correspond to their current course work.

1.00, Online Only

RMD-701 Core Clerkship: Primary Care

This is a required core clerkship for all third-year medical students. Students will be imbedded in either a Family Medicine or Internal Medicine ambulatory office for 4 weeks. Students will independently evaluate, present, and care for patients while working directly with attending preceptors. This will be a primarily outpatient experience and is meant to immerse students in the primary care of patients on all levels, including acute care, chronic illness care, and preventive care. Curriculum will highlight the unique relationships and specialized patient care that occurs in this setting.

4.00, Clinical | Web Component

RMD-710 Transition to Residency I

In the year-long Transition to Residency course, students will master the skills to make a successful transition from undergraduate to graduate medical education (residency). In the course's initial year, the students will learn the elements involved in matching into a residency position. In order to maintain the flexibility and individuality of each student's fourth year experience, many of the resources will be made available as online modules which students can take when it fits into their schedule. Fall term will include USMLE Step 2 preparation, creating professional documents in support of application to residency, and refining interviewing skills. Spring term will include creation of rank order lists, financial aid literacy, and will culminate in a two-week Clinical Bridge course.

1.00, Web Component

RMD-711 Transition to Residency II

In the year-long Transition to Residency course, students will master the skills to make a successful transition from undergraduate to graduate medical education (residency). In the course's initial year, the students will learn the elements involved in matching into a residency position. In order to maintain the flexibility and individuality of each student's fourth year experience,

many of the resources will be made available as online modules which students can take when it fits into their schedule. Fall term will include USMLE Step 2 preparation, creating professional documents in support of application to residency, and refining interviewing skills. Spring term will include creation of rank order lists, financial aid literacy, and will culminate in a two-week Clinical Bridge course.

1.00, Web Component

RMD-720 Careers in Medicine

Students interested in the CiM elective will identify one specialty to pursue for the two week clerkship. The students will be paired with one or two attendings for the two week period. Students will be expected to spend 85% of their time with physicians participating in patient care to experience the daily life of a practitioner in both the inpatient and the outpatient settings as appropriate for the specialty. They will spend the remaining 15% of their time in independent study researching the specialty and completing exercises on the Careers in Medicine website. The specialties available will be those into which students can match upon graduation from medical school (either into a categorical or advanced program) including Anesthesia, Radiology, Dermatology, Pathology, Physical Medicine and Rehabilitation, Ophthalmology, Cardiothoracic surgery, Neurosurgery, Orthopedic surgery, Otolaryngology, Radiation Oncology, Urology. Specialties not eligible for this course include the Core clerkships (Psychiatry, Neurology, Family Medicine, Obstetrics and Gynecology, Pediatrics, Surgery, Internal Medicine, and Emergency Medicine).

2.00, Clinical

RMD-721 Ambulatory Medicine

Third year medical students will be placed in either a Family Medicine or Internal Medicine ambulatory office or clinic for two weeks. Students will independently evaluate, present, and care for patients while working with directly with attending preceptors. This will be a primarily outpatient experience and meant to immerse students in the ambulatory care of patients.

2.00, Clinical

RMD-722 Clinical Bridge Course

This course is designed to bridge the gap between medical student knowledge and expectations of day-one interns. Through small group, case-based discussions, this elective will expose fourth-year medical students to common intern-level concepts with an emphasis on high yield information and the thought process that drives clinical reasoning.

2.00, Classroom

RMD-723 Medical Informatics

Students will be given an introduction to the field of clinical informatics and complete a research project in informatics. An overview of Healthcare Information Technology (HIT) will be provided with an emphasis on elements relevant to clinical careers and informatics research. Students will complete a research project evaluating an informatics application for efficacy, usability, or impact on clinical outcomes.

4.00, Clinical

RMD-726 Mindfulness in Medicine

Mindfulness Based Stress Reduction is a curriculum taught for more than 30 years that teaches skills, drawn largely from mindfulness (or insight) meditation traditions, that promote the capacity for holding experience in non-judgmental awareness; and cultivates patience, compassion (to self and other), clarity during moments of emotional distress, quicker resolution of stress reactivity, and creative responses to stressors.

1.00, Clinical

RMD-730 Clinical Nutrition

Students will determine what foods make up a healthy diet and make recommendations to change food intake to improve the diet. They will know what foods make up nutrition therapeutic diets to prevent or treat acute and chronic disease. This will be accomplished by projects, online course material to read or interact with and collaborating with registered dietitians at RUMC for nutrition support recommendations.

2.00, Classroom

RMD-780 Basic Biomedical Research I

One of a two-course series, RMD-780 will introduce the student to various aspects of the theory and practice of biomedical research. Includes lectures, Journal Club, a written project proposal, practical experience and a written paper on a laboratory technique.

1.00, Classroom | Web Component

RMD-781 Basic Biomedical Research II

This is one of a two term course that will introduce the students to various aspects of the theory and practice of biomedical research. It includes lectures, journal club, a written project proposal, practical experience and a written paper on a laboratory technique.

1.00, Classroom | Web Component

RMD-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their

degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

RMD-EXM Primary Care Exam Remediation

Remediation of core Primary Care examination only.

4.00, Clinical

RMT-504 Physicianship IV

The 2-year Physicianship Program is a patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors, and prepare students for full-time clinical duties beginning with their 3rd-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations.

1.00, Classroom | Web Component

RMT-505 Physicianship V

The 2-year Physicianship Program is a patient-centered, integrated, multi-disciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes, and behaviors, and prepare students for full-time clinical duties beginning with their 3rd-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations.

1.00, Classroom | Web Component

RMT-505E Physicianship V - Exam Makeup

Physicianship V exam makeup only.

1.00, RMC Exam Makeup

RMT-505R Physicianship V - Remediation

Physicianship V remediation only.

1.00, RMC Remediation

RSA-501 Management Principles/Organizational Theory

This course is an introduction to principles and models of management, leadership and organization and human behavior in the workplace. The course will also provide information on various organizational models for research administration, evaluation methods and change implementation with the goal of increasing management and organizational effectiveness. Organizational structure, hierarchy, decision making, management of change and evaluation paradigms will be discussed. The course will provide the student with a better understanding of

how to be an effective manager in a variety of organizational settings and job positions in the research administration arena.
4.00, Online Only

RSA-502 Theory: Grants/Contracts Administration

This course will introduce students to the principles of grants and contracts management including the lifecycle of a grant or contract, how grant proposals and contract bids are developed, what the essential difference is between a grant and contract, the contract negotiation process, the subcontracting process and the regulations that govern grants and contracts including the Federal Acquisition Regulations. Students will be introduced to all areas of research administration including pre-award and post-award administration, responsible conduct of research and technology transfer. Some of the basics that the student will learn are: how a grant proposal is developed, the management of grants, contracts and subcontracts, what the essential difference is between a grant and a contract, how to respond to a Request For Application or Request For Proposal, the negotiation process, and the regulations that govern grants and contracts including the Federal Acquisition Regulations. The course will provide the student with a better understanding of how to manage a sponsored projects pre-award office and what electronic systems are available to assist in applying for and managing grants and contracts.

4.00, Online Only

RSA-510 Project Management

This course will provide students with the knowledge to assume a leadership position in sponsored projects or clinical trials administration. The course will include grant development and application preparation, IRB review and informed consent, subject recruitment and retention, study budget preparation, and institutional training opportunities. The course will provide students with the knowledge to manage grant development, and application, working with faculty researchers, and training departmental and college research administrators. This course will also provide students with the knowledge and skills to function as a clinical trials administrator through the management of the IRB approval process, subject recruitment and informed consent, multi-center clinical studies, data collection and progress reporting, study budget preparation and the financial management of clinical studies

4.00, Online Only

RSA-512 Budgeting & Fiscal Management

This course provides an overview of the principles governing the fiscal management of grants and contracts. The requirements that sponsors have regarding sound fiscal management of sponsored awards: grant, cooperative agreements and contracts

will be presented. The student will learn how to develop a research business plan, how to prepare for an A-133 audit, what costs are allowable and allocable to a grant or contract, tracking awards, effort reporting, billing cost reimbursable contacts, managing accounts receivable, preparing and negotiating an Facilities & Administration Costs rate proposal. The course will provide the student with a comprehensible understanding of the requirements to best manage funds received on sponsored awards and what electronic systems are available to facilitate the post award management of grants and contracts.

4.00, Online Only

RSA-513 Introduction to Clinical Research Management

This is an overview of Clinical Research Management. Topics include financial management, regulatory management and operational management of clinical research. The course contains a mix of theory, basic tools and best practice designed to provide students with the background necessary to administer clinical studies in their practice.

4.00, Online Only

RSA-514 Legal/Ethical/Regulatory Compliance

This course introduces students to legal, ethical and regulatory issues encountered in monitoring, implementing, and managing research projects. Students will learn to apply ethical principles and legal and regulatory requirements to develop compliance programs, monitor investigator and institutional compliance, and implement corrective action. Students will learn how to design and implement a compliance program, processes for monitoring compliance, and how to apply appropriate principles and processes to correcting non-compliance. The primary emphasis of the course will be on fundamental issues involved in structuring compliance programs that conform to legal requirements as well as principles of scientific integrity.

4.00, Online Only

RSA-516 Intellectual Property & Technology Transfer

This course will introduce students to US patent and contract laws, copyright and trademark laws and procedures, patent cooperation treaty laws and procedures, confidential disclosure agreements, licensing options and inter institutional agreements to protect proprietary rights of institutions and inventors. The preparation of the patent applications, and the filing with, and examination by, the United States Patent and Trademark Office (USPTO) will also be taught. Students will learn how to apply the relevant laws and procedures, how to properly prepare technology transfer documents and using effective, successful negotiation strategies.

4.00, Online Only

RSA-518 Introduction to International Research Administration

Various areas within research administration—pre-award, post-award, contracting, and research compliance are covered in relation to their international counterparts. In addition, the relationship of grants office to their international office counterparts, will also be covered. The course is designed to contain a mix theory, practical tools, and best practices.

4.00, Classroom

RSA-595 Special Topics in Research Administration

Directed readings in an area of Research Administration. The student in consultation with Faculty and the Program Director chooses the topic. The student finds relevant literature, refines the topic and integrates the readings into a review of the literature. This is an elective course designed for the advanced student. It may be used as additional credit or when a required course was waived based on experience and/or prior coursework. Requires permission of Program Director to register.

2.00-4.00, Classroom | Web Component

RSA-596A Practicum I

Introduces students to research administration policy, procedure and operations. Areas include grants administration, project management, budget and fiscal management, compliance and audit, intellectual property and technology transfer. Students will rotate through each administrative area.

4.00, Web Component

RSA-596B Practicum II

The overall aim of Practicum II is to allow students to gain additional practical experience in the administrative area of concentration that they select: sponsored projects, clinical trials management, research finance, research compliance, research integrity, and intellectual property and technology transfer. This course will provide the student with further experience in their selected area of concentration.

4.00, Web Component

RSA-596PA Practicum I

Introduces students to research administration policy, procedure and operations. Areas include: grants administration, project management, budget and fiscal management, compliance and audit, intellectual property and technology transfer. Students will rotate through each administrative area. Prerequisites: Satisfactory completion of first year course work.

4.00, Practicum | Web Component

RSA-596PB Practicum II

The overall aim of Practicum II is to allow students to gain additional practical experience in the administrative area of concentration that they select: sponsored projects, clinical trials management, research finance, research compliance, research integrity, and intellectual property and technology transfer. This course will provide the student with further experience in their selected area of concentration.

4.00, Practicum | Web Component

RSA-598A Research Project I

First part in planning and conducting the required master's degree research project. Guided activities to develop an appropriate research question and research methodology for completion of the research requirements. Students are expected to begin formulation of their research questions and to complete their review of the literature. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results. The goal of conducting a research project is to prepare the students to become informed users of management literature and related research. Students will conduct research in areas of specialization chosen by the student or in an area of general research administration and practice. Through research the student will increase knowledge within the discipline and promote interdisciplinary collaboration. The student will advance the science and practice of research administration by providing a link between basic science research, clinical research and management practice.

2.00, Classroom | Web Component

RSA-598B Research Project II

Continuation of Research Project I. Guided activities to develop an appropriate research question and research methodology and begin data collection for completion of the required program research requirements. At the completion of this course the student should be ready to present their research proposal to their committee for the preliminary defense and to begin and complete the data collection phase of their research. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results.

2.00, Online Only

RSA-598C Research Project III

Continuation of Research Project II. During this phase, the research report is completed and the final defense of the project takes place. Completion of data collection, analysis, results and discussion for completion of the required program research

requirements. Students are required to formally present the results of their projects to the faculty and student body, and are encouraged to publish their results.

2.00, Classroom | Web Component

RSA-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

SBB-580 Human Blood Group Systems

Focus on human blood group systems; biochemistry, inheritance, serologic activity, clinical significance and disease associations. Topics include, but are not limited to, fundamentals of immunology, molecular biology, red blood cell membrane structure, and genetics as they relate to blood group systems. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor.

4.00, Online Only

SBB-581 Principles & Methods of ABID

Review of methods for the detection and identification of antibodies with specificity for human red cell antigens. Topics include, but are not limited to, history of transfusion medicine, serological systems, direct and indirect antiglobulin tests. Focus on resolution of complex antibody problems. Taught only online. Extensive computer use required.

2.00, Online Only

SBB-582 Blood Procurement/Blood Product Manufacturing

The focus of this course is on theoretical and practical concepts used in human blood procurement and blood product manufacturing. Topics include, but are not limited to, red blood cell & platelet preservation, the oxygen dissociation curve, basic coagulation, allogeneic & autologous blood donor selection, whole blood collection & component preparation, labeling, storage, distribution & use, donor testing, transfusion infectious diseases, storage lesions, hematopoietic progenitor cell (HPC) collection & use. Taught only online. Extensive computer use required.

3.00, Online Only

SBB-583 Blood Bank/Transfusion Service Operation

Review of theoretical and practical concepts used in blood bank and transfusion service operation. Topics include, but are not limited to, safety and federal regulatory requirements, disaster management, administration of blood components process validation, automation, human resources management, budgeting, competency assessment. Focus on quality management systems; QC, QA, QM, blood utilization management, error management. Taught only online. Extensive computer use required. 3.00, Online Only

SBB-584 Clinical Immunohematology & Transfusion

Focus on transfusion medicine practice and therapy. Topics include, but are not limited to, human circulatory system, effects of shock, blood component therapy, special transfusion, perinatal, neonatal & pediatric transfusion practice, hemolytic disease of the newborn, transplantation, anemias, infectious and noninfectious complications of blood transfusion. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor. 4.00, Online Only

SBB-585 Selected Topics & Comprehensive Review

Advanced study of current trends; assigned topics in current literature read, evaluated and discussed. Topics include, but are not limited to, basics of research and education, information systems in blood bank, parentage testing, medical-legal, and ethical aspects of blood banking, and laboratory math for the blood banker. A comprehensive review and exam is provided for students completing the SBB program and eligible to sit for the ASCP SBB certification examination. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor. 3.00, Online Only

SBB-585 Comprehensive Review

Is a comprehensive review in preparation for the ASCP SBB Certification Exam. SBB 585 is designed to help fulfill requirements for eligibility to take the Specialist in Blood Bank Technology (SBB) certification examination given by the American Society of Clinical Pathologists Board of Registry. SBB 585 is a core course for the specialist in Blood Banking Technology Certification Program (SBB). Therefore, students pursuing this certification should achieve a grade of B or better in this course. Due to prerequisites required to progress in the SBB program, SBB students who receive a grade of incomplete or a grade below B for this course will not be allowed to register for subsequent SBB core courses. LT grade 3.00, Online Only

SBB-586 Specialist in Blood Bank Clinical Practicum

Field experience under supervision of a professional expert in a blood center and/or hospital transfusion service setting. Students enrolled in the SBB Traditional curriculum must participate in clinical site visits and serologic resolution of clinical specimens. Students must take a minimum of 4 QH within 4 quarters. It is recommended that the student take no more than 4 QH within any given quarter. Clinical sites include, but are not limited to, apheresis centers, donor centers, stem cell processing centers, and transfusion service centers. 2.00-4.00, Online Only

SBB-586 Specialist in Blood Bank Clinical Practicum

Field experience under supervision of a professional expert in a blood center and/or hospital transfusion service setting. Students enrolled in the SBB Traditional curriculum must participate in clinical site visits and serologic resolution of clinical specimens. Students must take a minimum of 4 QH within 4 quarters. It is recommended that the student take no more than 4 QH within any given quarter. Clinical sites include, but are not limited to, apheresis centers, donor centers, stem cell processing centers, and transfusion service centers. 1.00-6.00, Online Only

SBB-587 Specialist in Blood Bank Project

Independent investigation of a topic relevant to an area in immunohematology. Student submits a written research paper as well as prepares and delivers a presentation based on the topic selected. Students enrolled in the SBB Traditional curriculum must participate in a research project and develop a presentation for a professional audience. Students must take a minimum of 3 QH within 4 quarters. It is recommended that the student take no more than 3 QH within any given quarter. P/N grading. 1.00-3.00, Online Only

SBB-587 Specialist in Blood Bank Project

Is a course that consists of current topics in transfusion medicine, scientific and technical writing, and presentation skills. The selected topics include Research, Education, Reading & Evaluating a Research Paper, Parentage Testing, Medico-Legal & Ethical Issues, and a review of Laboratory Math pertinent to the SBB candidate. SBB 587 is a core course for the Specialist in Blood Banking Technology Certification Program (SBB). Therefore,, students pursuing this certification should achieve a grade of B or better in this course. Due to prerequisites required to progress in the SBB program, SBB students who receive a grade of incomplete or a grade below B for this course will not be allowed to register for subsequent SBB core courses. LT grade 3.00, Online Only

SBB-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

1.00, Continuous Enrollment

SUR-701 Core Clerkship: Surgery

The Core Clerkship in Surgery will consist of an 8-week general surgery component in the M3 year. During Surgery, the principles of pre-operative and post-operative care, diagnosis of surgical disease, indications for surgery, recognition and response to surgical emergencies, and the physiological principles of surgery are stressed through the case study method. Students will be involved in the care of approximately three patients per week. Technical experience is provided in the operating rooms and clinical skills lab. Outpatient clinics, lectures and conferences provide additional direct contact with faculty.

8.00, Clinical | Web Component

SUR-710 General Surgery Subinternship

Under supervision, the student assumes many of the duties and responsibilities of a resident physician. This includes responsibility for preoperative and postoperative care, participation in surgery, and rotating on the night on-call schedule. On-call responsibilities for the surgical sub-intern are at the level of the first year resident, namely, sub-interns will be the first member of the surgical team to see in-hospital consults, emergency room patients, and answer calls from the nurses. They will be supervised by in-house residents. The work is primarily with hospitalized patients; however, there is an opportunity to work with ambulatory and elective surgical patients. Independent library investigative projects are assigned.

4.00, Clinical

SUR-711 Cardiovascular Surgery

This course emphasizes the clinical diagnosis and surgical management of adult and pediatric cardiac disorders. Preoperative evaluation including review of cardiac catheterization data, intraoperative management and postoperative care are discussed at conferences and in the operating room. Indications for surgery, preoperative evaluation and postoperative care are discussed at patient rounds, in conferences and on an individualized basis.

4.00, Clinical

SUR-712 Surgical Intensive Care

This rotation exposes the experienced student to comprehensive management of critically ill surgical patients. Application of advanced life support techniques including vaso-active drugs, mechanical aids to circulation, pacing, and respiratory therapy are reviewed. Pathophysiologic discussion and integration with cardiopulmonary analysis of data obtained from invasive monitoring are emphasized. Radiologic, medical, and surgical aspects of critical care medicine are also incorporated. Students will attempt to function as sub-interns with direct patient responsibilities.

4.00, Clinical

SUR-713 Peripheral Vascular Surgery

This course emphasizes the clinical non-invasive laboratory and radiologic diagnosis of peripheral vascular disorders considered for surgical management. Indications for surgery, pre-operative evaluation and post-operative care are discussed at patient rounds, in conferences and in the operating room. This rotation allows extensive time in the operating room with open cases. The student will work closely with the Vascular Fellow and Attendings.

4.00, Clinical

SUR-716 Plastic & Reconstructive Surgery

The primary goal of this clerkship is to provide an introduction to the surgical subspecialty of plastic and reconstructive surgery in as many of its various elements and diverse applications as possible. Plastic surgery covers a broad array of surgical/medical problems including wound healing; burns, both acute and long-term care; congenital anomalies such as cleft lip and palate and other craniofacial defects; breast surgery including breast reduction, augmentation, and reconstruction following mastectomy; microsurgical procedures for a free flap transfer, nerve repair, and other means of tissue transposition; hand surgery, ranging from acute industrial accidents to long-term rehabilitation for neuromuscular problems; care of facial fractures, both acute and delayed repair; care for trunk and extremity problems, relating both to trauma and tumor extirpation; and aesthetic surgery of the face, extremities and trunk.

2.00-4.00, Clinical

SUR-726 Principles of Urology

This clerkship provides further experience in the diagnosis and management of urological problems as a supplement to the basic clerkship in surgery.

4.00, Clinical

SUR-727 Genitourinary Neoplasia

This course is designed to present the basic concepts of neoplasia, using the genitourinary neoplasms as models. The student actively participates in the management of both hospitalized and ambulatory patients. Multidisciplinary seminars and individual projects are available. Approval to take this course must be obtained from Dr. Coogan prior to registration.

4.00, Clinical

SUR-731 Pain Management

This rotation exposes the experienced student to the care and management of patients with low back pain, post herpetic neuropathy, complex regional pain syndrome and other common pain problems. This is a busy office setting where students will see new and returning patients to take histories, perform physical exams and assist in various nerve block procedures. Student will function as a junior house officer.

2.00-4.00, Clinical

SUR-751 Orthopedics

This fourth-year elective rotation in Orthopedic Surgery is intended for students considering a career path requiring knowledge of musculoskeletal problems. Students are assigned to work with individual attendings on the Adult Reconstructive Service, Foot-Ankle-Hand Service, Sports Medicine Service, Pediatric and Tumor Service, or the Spine Service. Students work with individual attendings in an office/clinic setting, assist in surgery, and round on inpatients. Students are required to attend the various clinical and resident education conferences. Educational goals include review of functional anatomy, understanding of injury triage, and concepts of treatment.

4.00, Clinical

SUR-751X Orthopedics-Away

Intended for students considering a career path requiring a knowledge of musculoskeletal problems. Students work with individual attendings on either the Joint Reconstructive Service, Foot-Ankle-Hand Service, Sports Medicine Service, Pediatric and Tumor Service, the Spine Service, or the Shriner's Hospital Pediatric Service. Students work with individual attendings in an office clinic setting, assist in surgery, and round on inpatients. Students are required to attend various clinical and resident education conferences. All students meet weekly with the course director for a student-only education conference. Educational goals include review of functional anatomy, understanding of injury triage, and concepts of treatment. Night call is not required, but is encouraged. Prerequisite: SUR 701, fourth year standing.

2.00-4.00, Clinical

SUR-752 Orthopedic Research

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks? maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs.

4.00, Clinical

SUR-756 Neurosurgery

This clinical clerkship expands upon and demonstrates the practical application of neurological sciences. The diagnosis and management of both simple and complex neurosurgically-oriented disorders are addressed. Conferences with both the resident and attending staff are held weekly.

4.00, Clinical

SUR-756X Neurosurgery-Away

This clinical clerkship expands upon and demonstrates the practical application of neurological sciences. The diagnosis and management of both simple and complex neurosurgically-oriented disorders are addressed. Conferences with both the resident and attending staff are held weekly. Emphasis is placed on the basic neurosciences especially neuroanatomy and pathophysiology. Prerequisite: SUR 701.

2.00-4.00, Clinical

SUR-757 Principles of Ophthalmic Exam

The purpose of this course is to acquaint students with the surgical specialty of Ophthalmology. They will learn basic ophthalmic terminology, history and examination principles, attend daily rounds and other didactic sessions, and observe surgery. It is intended that the students will not only learn techniques of examination which will be useful in their own medical practices, but will also understand the capabilities and limitations of the ophthalmologist in order to make better use of ophthalmic consultations. This clerkship may also be taken as a four-week clerkship if prior approval is received from Jack A. Cohen, M.D., the Associate Chairman for Education in the Department of Ophthalmology (Jack_A_Cohen@rush.edu). During the second

two-week period, the student will gain experience in performing history and physical examinations and will work up patients to present to resident and attending physicians. The student will learn to perform more sophisticated techniques of examination, including slit lamp funduscopic examination and indirect ophthalmoscopy. In general, the student will gain hands-on experience in ophthalmic examination, diagnosis, and theory. 2.00-4.00, Clinical

SUR-759 Otolaryngology

Clinical experience is provided in the diagnosis and management of patients with diseases of the ear, nose, throat, head, and neck. Office practice, in addition to the care of hospitalized patients, provides the basis for clinical instruction, with emphasis on case study and proper use of instruments. Departments of Pathology, Radiology and Otology Conferences and Journal Club are included. 2.00-4.00, Clinical

SUR-761 Surgical Oncology

Concentrated experience in the surgical diagnosis and management of patients with tumors is provided. Correlation of surgical problems with anatomic and pathological physiology is stressed, including examination of gross and microscopic tissue. Attendance at the tumor clinic and tumor conference is required. Students may also enroll in this clerkship for six weeks by contacting the Office of Medical Student Programs. 4.00-6.00, Clinical

SUR-761X Surgical Oncology-Away

Concentrated experience in the surgical diagnosis and management of patients with tumors is provided. Correlation of surgical problems with anatomic and pathological physiology is stressed, including examination of gross and microscopic tissue. Attendance at the tumor clinic, tumor conference, and head and neck tumor conference is required. Prerequisite: SUR 701. 4.00-6.00, Clinical

SUR-765 Colon and Rectal Surgery

Close one-on-one instruction between the student and physician in an apprentice-teacher relationship. The student accompanies the physician in all outpatient clinic office hours, as well as surgical procedures, and hospital rounds. This involves spending approximately 15 hours per week in a clinic environment, assisting in approximately 50 surgical and endoscopic procedures over the month and daily in-hospital rounds. No night call required. The grade will be determined by an essay exam, course clinical evaluations, submitted history and physical exams, and classroom participation. 4.00, Clinical

SUR-771 Thoracic Surgery

The diagnosis, operative, and postoperative care of patients with pulmonary and esophageal disorders are studied in both hospitalized and ambulatory patients. In addition, students assist in patient care, and topics are assigned for discussion. 4.00, Clinical

SUR-771X Thoracic Surgery-Away

The diagnosis, and operative and postoperative care of patients with pulmonary and esophageal disorders are studied in both hospitalized and ambulatory patients. In addition, students assist in patient care, and topics are assigned for discussion. Prerequisite: SUR 701 4.00, Clinical

SUR-781 Research in Surgery

Students may arrange research rotations individually with faculty at Rush. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter describing the student's activities, responsibilities, amount of supervision, and the specific dates of the rotation. Credit toward graduation is granted assuming that the research project is ongoing throughout the academic year. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Office of Clinical Curriculum before beginning the rotation. Research rotations are scheduled for a minimum of four weeks of credit with the expectation that the full project will extend beyond the formal course duration. Depending on the proposal, the weeks of credit may or may not apply to the rule of 8-weeks maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. 4.00, Clinical

SUR-782 Research in Anesthesiology

[4 weeks]

4.00, Clinical

SUR-794 Advanced Surgery

Advanced Surgery offers an opportunity for Rush students and especially outside students to become familiar with the Department of General Surgery at Rush University Medical Center. The student will participate in the rotation in a manner similar to the 3rd year students and may assume some of the duties and responsibilities of the junior residents, depending upon their familiarity with the task involved. Students will become involved in preoperative and postoperative care, they will participate in surgery, and 4th year students rotating in Advanced Surgery will take part in the in-house call schedule

on a shared rotating basis with 3rd year students. The work is primarily with hospitalized patients, however, there is an opportunity for ambulatory and elective surgery.

4.00, Clinical

SUR-795 Anesthesiology

The program enables medical students to learn airway management; recognize circulatory inadequacy and initiate support of the failing circulation; induce topical and infiltrative anesthesia safely; understand the actions and interactions of depressant and stimulant drugs commonly encountered or used by anesthesiologists; and participate in pre-operative evaluation preparations of surgical and obstetric patients. Prerequisite: MED 701, OBG 701, SUR 701.

4.00, Clinical

SUR-796 Transplantation

The clinical aspects of transplantation, including donor and recipient surgery, and pre-operative and post-operative care are studied. The student participates in organ preservation care as well. Seminars on the fundamental and clinical aspects of transplant immunology are held.

4.00, Clinical

SUR-7EI Surgery Elective

Students may receive credit for an individually arranged elective with a Rush faculty members. In order to receive credit for such a rotation, the person to whom the student will be responsible must write a letter stating the student's activities, responsibilities, amount of supervision, and specific dates of the rotation. The sponsoring faculty member must complete an evaluation of the student's performance at the conclusion of the elective. Students must submit a proposal to the Office of Clinical Curriculum for approval at least eight weeks before the rotation and must have written approval from the Assistant Dean of Clinical Curriculum before beginning the rotation. Students may receive four weeks of credit for an individually arranged elective. Credit for a maximum of only one individually arranged elective will count toward graduation requirements.

4.00, Clinical

SUR-808 Trauma/Critical Care Surgery

The Cook County Trauma Unit is one of the busiest urban trauma centers in the nation and offers an exceptional clinical experience for both medical students and residents. The trauma surgery rotation is designed to provide the senior-level medical student with an in-depth clinical experience in caring for the severely injured patient. The clerkship focuses on the initial management and associated decision-making, the necessary procedures and operative interventions, and the critical care necessary for survival of the trauma patient. The student is expected to

take an assertive role in patient care from the initial encounter with EMS until the patient is discharged from the hospital. Multi-level supervision and guidance is provided by the attending physicians and residents as well as the clinical support staff.

4.00-8.00, Clinical

SUR-808X Trauma/Critical Care Surgery-Away

This rotation is designed to provide the fourth year medical student with an in-depth clinical experience in the care of injured patients. Critical decision making and surgical training are the key elements taught during resuscitation, operative management and the critical care phase. The student will follow patients from the ambulance to their discharge home. Multi-level supervision and teaching is available from attending physicians and residents. Prerequisites: SUR 701, fourth-year standing.

4.00-8.00, Clinical

SUR-EXM Surgery Exam Remediation

Remediation of the core surgery miniboard only

2.00-8.00, Clinical

SUR-REM Surgery Clinical Remediation

Core surgery clinical remediation only – not required to retake the examination.

4.00, Clinical

VAS-301 Vascular Anatomy, Physiology and Pathophysiology

This course is a detailed survey of the large, small, and microscopic vascular anatomy of the human body including variations. Surrounding structures are also studied in their relationship to the vasculature. The purpose and normal mechanism of arterial and venous systems are studied. The disease mechanisms of a wide variety of disorders of arteries and veins will be presented, with emphasis on those diseases that can be assessed by noninvasive vascular studies. The risk factors, patient symptoms, and treatment of these vascular pathophysiologic processes will also be presented.

3.00, Classroom | Web Component

VAS-304 Vascular Terminology

Medical terminology will be presented with emphasis on terminology that is specific to vascular patients and terms that the vascular sonographer is likely to encounter in practice.

1.00, Classroom | Web Component

VAS-310A General Pathophysiology I

Pathologic processes for general and organ system pathology in the human body are covered in this and the sequential course including the manifestations of disease, etiology, pathogenesis, clinical features, diagnostic tools, prognoses and therapeutic options.

2.00, Online Only

VAS-310B General Pathophysiology II

This course is a continuation of VAS-310A Pathophysiology I. Pathologic processes for general and organ system pathology in the human body are covered in this course including the manifestations of disease, etiology, pathogenesis, clinical features, diagnostic tools, prognoses and therapeutic options.

3.00, Online Only

VAS-311 Ultrasound Physics and Physical Principles I

The basic principles of sound and ultrasound are presented including the important math concepts needed to use and understand these concepts. The emphasis in this course is on the theories behind ultrasound, including the basic parameters of sound, the creation of the B-mode image, the Doppler effect, continuous wave Doppler, pulsed wave Doppler and color flow imaging. Some basic hemodynamic principles are also introduced.

2.00-3.00, Classroom | Web Component

VAS-311A Physics Topics in Doppler & Color

This course is open to Advanced Placement students in the Vascular Ultrasound program. The principles of Doppler and color ultrasound techniques and instrumentation will be covered including the Doppler effect, Doppler equation, angle steering, angle correct, sample volume, spectral analysis, velocity measurement, color display, and color direction, among other related topics.

2.00, Classroom | Web Component

VAS-311L Ultrasound Physics and Physical Principles I Lab

Students will perform activities to demonstrate physical and ultrasound principles under a variety of conditions. Duplex equipment controls and equipment problem-solving will be emphasized in this course.

1.00, Laboratory | Web Component

VAS-312 Ultrasound Physics Doppler/Color

This course is open to Advanced Placement students in the vascular ultrasound program and covers selected principles of ultrasound physics. The principles of Doppler and color ultrasound techniques and instrumentation including Doppler effect, Doppler equation, angle steering, angle correct, sample volume, spectral analysis, velocity measurement, color display, and color direction will be covered, along with other related topics.

2.00, Classroom | Web Component

VAS-313 Ultrasound Physics and Physical Principles II

In Physics II, a continuation of the basic principles of B-mode, pulsed wave, and color Doppler are discussed emphasizing the

components of the duplex scanner. The interaction of ultrasound and tissue, including ultrasound artifacts and bioeffects are also examined.

3.00, Classroom | Web Component

VAS-321 Patient Care Practices

Vascular technologists interact with patients continually through the workday and have responsibilities for their care. This course prepares the technologist to offer patients safe examinations and transport, basic care of intravenous lines, oxygen, etc., and basic physical and emotional comfort during and around the time of testing. It offers the student information about general patient communication, and how to obtain patient history and symptoms of vascular disease while respecting the dignity and privacy of the patient. Patient attitudes in both health and disease are also reviewed in order to make the sonographer more conscious of these attitudes and processes in a diverse world.

2.00, Classroom | Web Component

VAS-321L Patient Care Practices Lab

Basic care of the vascular laboratory patient is presented in the didactic course and practiced in this laboratory course. Activities are provided to practice skills in providing basic physical comfort and care of the patient, transportation, and practice in communication skills. The student will also be introduced to other medical devices that they may encounter during patient testing such as catheters, drains, respirators, etc., and learn how to test and manage care around these devices within the scope of practice for a vascular sonographer

1.00, Laboratory | Web Component

VAS-331 Venous Ultrasound Procedures

The theories and processes for performing a duplex ultrasound scan to identify, locate, and assess venous thrombosis of the lower extremity veins is the primary focus of this course. Indications, mechanism of disease, data analysis, reporting, patient cases, and problem-solving procedures for testing patients with venous disease are covered. Upper extremity venous testing, vein mapping, and chronic venous insufficiency tests are introduced and secondary tests such as venous plethysmographic techniques are also covered.

2.00, Classroom | Web Component

VAS-331L Venous Ultrasound Procedure Lab

The venous ultrasound techniques, procedures, data analysis, reporting, and problem-solving will be practiced on models in the student laboratory. Students will observe actual patient exams in the hospital.

1.00, Laboratory | Web Component

VAS-341 Arterial Physiologic Procedures Lab

The theories, techniques, and processes of performing noninvasive physiologic arterial examinations of the lower and upper extremities is presented, including segmental pressures, continuous wave Doppler waveforms, and plethysmography. Indications, data analysis, reporting, patient cases, and problem-solving procedures are presented along with a segment describing the use of other imaging modalities to evaluate arteries such as CTA and MRA.

3.00, Classroom | Web Component

VAS-341L Arterial Physiologic Procedures Lab

The noninvasive physiologic arterial procedures, data analysis, reporting, and problem-solving will be practiced on models in the laboratory, including segmental pressures, continuous wave Doppler, and plethysmography. Students will observe actual patient exams in the hospital.

1.00, Laboratory | Web Component

VAS-351 Cerebrovascular Ultrasound Procedures

The theories, techniques, and processes of performing an extracranial cerebrovascular study using duplex ultrasound is presented, including indications, data analysis, reporting, patient cases, and problem-solving procedures.

2.00, Classroom | Web Component

VAS-351L Cerebrovascular Ultrasound Procedures Lab

The extracranial cerebrovascular techniques, procedures, data analysis, reporting, and problem-solving will be practiced on models in the laboratory using duplex ultrasound. Students will observe actual patient exams in the hospital.

1.00, Laboratory | Web Component

VAS-354 Transcranial Doppler (TCD)

The intracerebral anatomy and hemodynamics in health and disease will be presented in conjunction with the transcranial Doppler procedures. Students will learn theory, technique, data analysis, reporting, and problem-solving as well as practice TCD testing on models in the student laboratory in this course.

1.00, Class & Lab | Web Component

VAS-361 Abdominal Vascular Procedures

Duplex ultrasound procedures used to assess the aorta, iliac, renal, mesenteric, inferior vena cava, and hepatoportal vessels will be addressed in this course. Theory, indications, data analysis, reporting, patient cases, and problem-solving procedures for testing patients with abdominal vascular disease are also covered.

2.00, Classroom | Web Component

VAS-361L Abdominal Vascular Procedures Lab

The abdominal vascular procedures, data analysis, and problem-solving will be practiced on models in the laboratory using duplex equipment. Students will observe actual patient exams in the hospital.

1.00, Classroom | Laboratory | Web Component

VAS-371 Advanced Vascular Testing and Topics

More advanced examinations will be presented in this course including duplex scanning of the upper extremity veins, chronic venous insufficiency, vein mapping, and duplex scanning of the native arteries (upper and lower extremities), bypass grafts, extremity pseudoaneurysms and aneurysms, dialysis access grafts and arteriovenous fistulas. Indications, data analysis, reporting, patient cases, and problem-solving procedures for testing patients with complications/diseases are also covered, including segments on arterial and venous hemodynamics. Pre-requisite courses include venous, arterial physiologic, and cerebrovascular procedures as well as Ultrasound Physics I and II.

3.00, Classroom | Web Component

VAS-371L Advanced Vascular Testing Lab

The advance vascular procedures, data analysis, and problem-solving will be practiced on models in the laboratory using duplex equipment and case studies. Students will observe actual patient exams in the hospital.

1.00, Classroom | Laboratory | Web Component

VAS-381 Introduction to Research

This course is an introduction to test validation studies/statistics and research processes, including a hands-on approach to performing the methods introduced on small scale projects in class and in the research laboratory course.

2.00, Classroom | Web Component

VAS-381L Introduction to Research Lab

Students will perform basic research studies related to vascular technology in this course.

1.00, Classroom | Laboratory | Web Component

VAS-401 Professional Practice in Ultrasound

This course is designed to prepare the student for a career in vascular ultrasound by presenting topics such as professional resources of information and continuing education, certification, laboratory accreditation, reimbursement processes and current issues, scope of practice, legal/ethical issues, and managed care. Stress and time management, laboratory communication, and body mechanics are also covered for the technologist to care for himself in an intellectually, emotionally, and physically demanding profession.

3.00, Classroom | Web Component

VAS-405 Laboratory Management

This course gives a broad overview of management tasks, such as laboratory organization, quality processes, teamwork, leadership, managing change, preparing a budget, purchasing equipment, decision-making processes, and human resource issues.

2.00, Classroom | Web Component

VAS-415A Clinical Skills in Vascular Ultrasound I

During the first clinical rotation at an accredited vascular lab, the student and the clinical instructor will prepare a plan of study for the first quarter. It will entail the practice of 3-4 vascular exams from a list of 16 possible procedures and the plan is approved by the clinical coordinator. The student will first observe, then perform sections of vascular exams on patients, and go on to performing complete exams under the direct supervision of the clinical instructor. Indirect supervision will be allowed only with clinical instructor approval. Prerequisites: Students must have completed all junior level courses with a minimum passing grade of 'C' in each and achieved a cumulative GPA of at least 2.5

4.00-10.00, Clinical | Web Component

VAS-415B Clinical Skills Vascular Ultrasound II

During these three quarters, students will rotate through 1-3 other clinical sites. The student and the clinical instructor will create a plan of study for each quarter which will entail learning at least four new clinical skills. The plan will be approved by the clinical coordinator. Students will continue to observe, then perform sections, and finally perform complete vascular exams as their skills improve. After passing a test on a particular exam with a minimum grade of 'C', students will be allowed to perform that exam on patients with indirect supervision of the clinical instructor. Prerequisite: Students must pass the VAS 415 A-D courses in order.

3.00-6.00, Clinical | Web Component

VAS-415C Clinical Skills-Vascular Ultrasound III

During these three quarters, students will rotate through 1-3 other clinical sites. The student and the clinical instructor will create a plan of study for each quarter which will entail learning at least four new clinical skills. The plan will be approved by the clinical coordinator. Students will continue to observe, then perform sections, and finally perform complete vascular exams as their skills improve. After passing a test on a particular exam with a minimum grade of 'C', students will be allowed to perform that exam on patients with indirect supervision of the clinical instructor. Prerequisite: Students must pass the VAS 415 A-D courses in order.

3.00-6.00, Clinical | Web Component

VAS-415D Clinical Skills in Vascular Ultrasound IV

During these three quarters, students will rotate through 1-3 other clinical sites. The student and the clinical instructor will create a plan of study for each quarter which will entail learning at least four new clinical skills which will be approved by the clinical coordinator. Students will continue to observe, then perform sections, and finally perform complete vascular exams as their skills improve. Indirect supervision of the student on a particular exam will only be allowed after approval of the clinical instructor. Prerequisite: Students must pass the VAS 415 A-D courses in order.

3.00-6.00, Clinical | Web Component

VAS-420A Professional Skills I

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in following laboratory protocol, safety and environment, patient communication, patient management, professional development, time management, and teamwork. These skills were taught during the junior year particularly in the professional practices and patient care classes and are practiced in a clinical setting.

1.00, Clinical | Web Component

VAS-420B Professional Skills II

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in following laboratory protocol, safety and environment, patient communication, patient management, professional development, time management, and teamwork. These skills were taught during the junior year particularly in the professional practices and patient care classes and are practiced in a clinical setting.

1.00, Clinical | Web Component

VAS-420C Professional Skills III

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in following laboratory protocol, safety and environment, patient communication, patient management, professional development, time management, and teamwork. These skills were taught during the junior year particularly in the professional practices and patient care classes and are practiced in a clinical setting.

1.00, Clinical | Web Component

VAS-420D Professional Skills IV

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in following laboratory protocol, safety and environment,

patient communication, patient management, professional development, time management, and teamwork. These skills were taught during the junior year particularly in the professional practices and patient care classes and are practiced in a clinical setting.

1.00, Clinical | Web Component

VAS-425A Cumulative Clinical Skills in Vascular Ultrasound I

After students master new clinical skills with a passing grade, they must continue to practice and demonstrate consistent performance at an appropriate skill level in these vascular examinations. During this course, students will practice learned clinical skills at new clinical sites and be evaluated in an existing or new clinical setting.

1.00-4.00, Clinical | Web Component

VAS-425B Cumulative Clinical Skills in Vascular Ultrasound II

After students master new clinical skills with a passing grade, they must continue to practice and demonstrate consistent performance at an appropriate skill level in these vascular examinations. During this course, students will practice learned clinical skills at new clinical sites and be evaluated in an existing or new clinical setting.

1.00-4.00, Clinical | Web Component

VAS-425C Cumulative Clinical Skills in Vascular Ultrasound III

After students master new clinical skills with a passing grade, they must continue to demonstrate consistent performance at an appropriate skill level. During this course, students will continue to perform previously learned clinical skills at new and/or current clinical sites, demonstrating their ability to adjust to new protocols and clinical settings, and be evaluated for consistently high quality in these skills each quarter.

1.00-4.00, Clinical | Web Component

VAS-431 Senior Case Presentations I

Students will attend lectures on a variety of advanced topics and participate in Vascular Conferences. Students will also prepare, write and present case studies from the patient exams they have performed at their clinical sites.

1.00, Classroom | Web Component

VAS-432 Senior Lectures/Case Presentations II

Students will attend lectures on a variety of advanced topics and participate in Vascular Conferences. Students will also prepare and present or write case studies from the patient exams they have performed at the clinical site.

1.00, Classroom | Web Component

VAS-433 Senior Lecture/Case Presentations III

Students will attend lectures on a variety of advanced topics and participate in Vascular Lab Conferences. Students will also prepare, write, and present case studies from the patient exams they have performed at their clinical sites.

1.00, Classroom | Web Component

VAS-480 Vascular Ultrasound Comprehensive Review

This course is a comprehensive review to prepare the students to take the ARDMS certification examination to earn the RVT credential. The ARDMS examination content outline will be covered in vascular technology and ultrasound physics and followed by a comprehensive exam on the last day of class. Prerequisites: venous, arterial, cerebrovascular, transcranial Doppler, and abdominal procedures with the respective laboratory courses, clinical course instruction for three quarters, and physics I and II.

2.00, Classroom | Web Component

VAS-900 Independent Study

Independent study courses give students a unique opportunity to pursue a course of study not commonly included in the curriculum. If you are interested in pursuing an independent study, meet with the faculty member you want to work with to define the coursework and expectations.

1.00-12.00, Independent Study

VAS-999 Continuous Enrollment

The requirement for Continuous Enrollment applies to all students admitted or re-admitted for Fall 2015 or later. Doctoral students should follow program requirements for continuous enrollment and degree completion. Students who have not completed their degree requirements are required to maintain Continuous Enrollment through the College of their program until the degree is earned. Continuous Enrollment courses are graduate level courses set up by departments at Rush University for students who need to remain actively enrolled in the University while they finish their graduate work.

Continuous Enrollment

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