

University Catalog

2012 – 2013



RUSH MEDICAL COLLEGE • COLLEGE OF NURSING • COLLEGE OF HEALTH SCIENCES • THE GRADUATE COLLEGE

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.

2012-2013 Academic Calendar

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health	The Graduate College	College of Nursing	
Fall 2012							GEM/All Other Programs	Summer 2013 Anes. Grads
Registration Begins	7/23/2012				7/30/2012	7/30/2012	7/30/2012	
Registration Ends	8/12/2012				8/10/2012	8/10/2012	8/10/2012	
Start	8/13/2012	8/6/2012	7/2/2012	9/24/2012	9/10/2012	9/10/2012	9/10/2012	
Labor Day Holiday	9/3/2012	9/3/2012						
Thanksgiving Break	11/17-11/25/2012	11/17-11/25/2012				11/22-11/23/2012	11/22-11/23/2012	
Classes End					11/16/2012	12/12/2012	12/21/2012	
Final Exams	12/14 and 12/17/2012	12/19 and 12/21/2012			11/19-11/21/2012	12/13-12/21/2012	*see notes	
End	12/17/2012	12/21/2012	12/14/2012	12/14/2012	11/21/2012	12/21/2012	12/21/2012	
Graduation				12/22/2012	12/22/2012	12/22/2012	12/22/2012	
Christmas Holiday	12/25/2012	12/25/2012	12/25/2012	12/25/2012	12/25/2012	12/25/2012	12/25/2012	

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health	The Graduate College	College of Nursing
Winter 2013							
New Year's Holiday					1/1/2013	1/1/2013	
Registration Begins					10/29/2012	10/29/2012	
Registration Ends					11/9/2012	11/9/2012	
Start					1/2/2013	1/2/2013	
Classes End					3/8/2013	3/8/2013	
Final Exams					3/11-3/15/2013	3/11-3/15/2013	
End					3/15/2013	3/15/2013	
Graduation					3/16/2013	3/16/2013	

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health	The Graduate College	College of Nursing	
Spring 2013							GEM/All Other Programs	Summer 2013 Anes. Grads
New Year's Holiday	1/1/2013	1/1/2013	1/1/2013	1/1/2013			1/1/2013	
Registration Begin	10/29/2012				2/25/2013	2/25/2013		
Registration Ends	11/9/2012				3/8/2013	3/8/2013		
Start	1/7/2013	1/7/2013	1/7/2013	1/7/2013	3/25/2013	3/25/2013	1/7/2013	
MLK Holiday	1/21/2013	1/21/2013					1/21/2013	
Spring Break	3/9 - 3/17/2013							
Memorial Day					5/27/2013	5/27/2013		
Classes End					5/31/2013	5/31/2013	4/19/2013	
Final Exams	5/20 and 5/22/2013	3/15 and 3/18/2013			6/3-6/7/2013	6/3-6/7/2013	*see notes	
End	5/22/2013	3/18/2013	4/26/2013	5/22/2013	6/7/2013	6/7/2013	4/19/2013	
Graduation				5/23/2013	6/8/2013	6/8/2013	4/20/2013	
Commencement				5/23/2013	5/23/2013	5/23/2013	5/23/2013	

Term/Event	Rush Medical College M1	Rush Medical College M2	Rush Medical College M3	Rush Medical College M4	College of Health	The Graduate College	College of Nursing	
Summer 2013							GEM/All Other Programs	Summer 2013 Anes. Grads
Registration Begins					4/15/2013	4/8/2013	3/4/2013	3/4/2013
Registration Ends					4/26/2013	4/19/2013	3/15/2013	3/15/2013
Start			5/13/2013	5/13/2013	6/17/2013	6/10/2013	5/6/2013	5/6/2013
Memorial Day							5/27/2013	5/27/2013
Independence Day					7/4/2013	7/4/2013	7/4/2013	7/4/2013
Classes End					8/23/2013	8/30/2013	8/15/2013	10/4/2013
Final Exams					8/26-8/30/2013		*see notes	
End			8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/15/2013	10/4/2013
Graduation					8/31/2013	8/31/2013	8/16/2013	10/5/2013

*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

College of Nursing

Master of Science in Nursing

Post-Graduate Certificate and RNFA Course Series

Doctor of Nursing Practice

Doctor of Philosophy

College of Health Sciences

Bachelor of Science

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

Health Sciences

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Nursing Science

Pharmacology

Management

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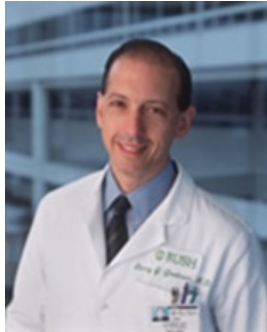
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Welcome to Rush University!



Rush University is dedicated to training in the clinical and basic sciences of health care and medical research. Its four colleges, Rush Medical College, the College of Nursing, the College of Health Sciences and The Graduate College, together train over 2100 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 stimulates each side to 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.

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 University Medical Center is to provide the very best care for our patients. 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.

Vision

Rush University Medical Center will be recognized at the medical center of choice in the Chicago area and among the very best in the United States.

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.

In 2012, Rush opened a new 376-bed hospital building, known as the Tower, which is part of the Medical Center's major renovation of its campus. 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 campuswide 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 11 of 16 specialty areas in *U.S. News & World Report's* 2012-13 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 and home to the team physicians for both the Chicago Bulls and the Chicago White Sox.

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

The mission of Rush University is to teach, study and provide the highest quality health care, using a unique and multidisciplinary practitioner-teacher model for health sciences education and research, while reflecting the diversity of our communities in its programs, faculty, students and service.

Vision

Rush University will use a practitioner-teacher model to develop health care leaders who collaboratively translate and develop knowledge into outstanding health care outcomes.

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, the College of Nursing, the College of Health Sciences and The Graduate College.

Rush Medical College is named for Benjamin Rush, a signer of the Declaration of Independence, who was a physician from Pennsylvania. Rush Medical College was chartered in 1837, 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, and 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.

The **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 a doctoral program in audiology and ten programs at the master's level, in addition, to bachelor's programs in clinical laboratory sciences, perfusion technology, respiratory care, and vascular ultrasound and 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 eight 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 old gold was the single histori-

cal 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 2012 enrollment figures.

Fall 2012 Enrollment	Men	Women	Total
Rush Medical College	277	273	550
College of Nursing	93	750	843
College of Health Sciences	134	467	601
The Graduate College	95	117	212
Grand Total			2,206

Students by Race and Ethnicity	Total
American Indian or Alaska Native	6
Asian	311
Black or African American	140
Hispanic	163
Native Hawaiian or Other Pacific Islanders	9
White	1,496
Two or More Races	23
Unknown	58
Grand Total	2,206

Student Financial Aid Data

Receiving Pell Grant (undergraduates): 30%

Accreditation, Authorization and Licenses

Rush University

Higher Learning Commission of the North Central Association of Colleges and Schools
30 N. LaSalle St, Suite 2400
Chicago, IL 60602
<http://www.ncahlc.org>

Rush Medical College

Accreditation Council for Continuing Medical Education (ACCME)
515 N. State St, Suite 2150
Chicago, IL 60610
(312) 755-7401
<http://www.accme.org>

Accreditation Council of Graduate Medical Education (ACGME)
515 N. State St, Suite 2000
Chicago, IL 60610
(312) 755-5000
<http://www.acgme.org>

American Medical Association (AMA)
515 N. State St
Chicago, IL 60610
(312) 464-4933
<http://www.ama-assn.org>

Association of American Medical Colleges (AAMC)
2450 N Street NW
Washington, DC 20037
(202) 828-0400
<http://www.aamc.org>

Liaison Committee on Medical Education (LCME)
2450 N Street NW
Washington, DC 20037
(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) 692-7050
<http://www.aana.com>

College of Health Sciences

Department of Clinical Laboratory Sciences

BS and MS programs:

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>

Specialist in Blood Bank certificate program:

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

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.eatright.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 Boulevard
Rockville, MD 20850-3289
(301) 296-5700
http://www.asha.org/academic/accreditation/CAA_overview.htm

Department of Health Systems Management

Commission on Accreditation of Healthcare Management Education
(CAHME)

2111 Wilson Boulevard, Suite 700

Arlington, VA 22201

(703) 351-5010 ext 3

<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

(847) 939-3597

(773) 714-8880

(773) 714-8886 (Fax)

<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

<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

ACOTE

c/o Accreditation Department

American Occupational Therapy Association (AOTA)

4720 Montgomery Lane, Suite 200

Bethesda, MD 20814-3449

(301) 652-6611 x2914

<http://www.acoteonline.org>

Perfusion Technology

Accreditation Committee – Perfusion Education

6654 South Sycamore Street

Littleton, Colorado 80120

(303) 738-0770

<http://www.ac-pe.org>

Physician Assistant Studies

Accreditation Review Commission on Education for the Physician
Assistant, Inc (ARC-PA)

12000 Findley Road, 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)

1549 Clairmont Rd, Suite 103

Decatur, GA 30033

(404) 320-1472

<http://www.acpe.edu>

Department of Respiratory Care

Commission on Accreditation for Respiratory Care (CoARC)

1248 Harwood Road

Bedford, TX 76021-4244

(817) 283-2835

FAX: (817) 354-8519

<http://www.coarc.com>

**Department of Vascular Ultrasound and
Technology**

Commission on Accreditation of Allied Health Education Programs
(CAAHEP)

1361 Park St.

Clearwater, FL 33756

(727) 210-2350

(727) 210-2354 (fax)

<http://www.caahep.org>

Authorization

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

Illinois Board of Higher Education
431 East Adams, 2nd Floor
Springfield, IL 62701-1404
(317) 782-2551
(217) 782-8548
<http://www.ibhe.state.il.us>

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 program 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 alumni of Rush Medical College, the College of Nursing, the College of Health Sciences, the Graduate College, former Medical Center house staff and graduates of our predecessor schools 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
- The Alumni Association of the Department of Health Systems Management
- Rush University Occupational Therapy Alumni Association
- 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.

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 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.

Lisa Yang, Director, Employee Relations and Equal Employment Opportunity Officer, has been designated to oversee the implementation of this policy for Rush University. Ms. Yang can be contacted by telephone at (312) 942-5916 or via email at Lisa_Yang@rush.edu.

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

Sharon Gates, MA
Senior Director, Multicultural Affairs, Community Service, and Global Health for Rush University
984A Armour Academic Center

(312) 942-3670
Sharon_Gates@rush.edu

Paula J. Brown, MBA
Manager, Equal Opportunity Programs, Rush University Medical
Center
128 Professional Office Building
(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, lectures or course directors.

Rush University Student Disability Assessment Team (RUSDAT)

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

College of Nursing – Sarah H. Ailey, Ph.D., R.N., PHCNS-SC
(312) 942-3383
Sarah_H_Ailey@rush.edu

College of Health Sciences – Joanne Schupbach, M.S., M.A.
(312) 942-3676
Joanne_E_Schupbach@rush.edu

The Graduate College
James M. Williams, Ph.D.
(312) 942-3598
James_M_Williams@rush.edu

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

Additional information can be found at:
<http://www.rushu.rush.edu/catalog/aboutrush/disabilityrights.html>

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 Street, Suite 128
Chicago, IL 60612
Tel. 312-942-7094
Fax. 312-942-4283
Email. 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 (128 Professional Office Building), 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.

University Assessment and Student Learning

The Office of University Assessment and Student Learning (UASL) seeks to support quality educational programs at Rush University and to foster excellence in educational practices by establishing and maintaining a culture of assessment and improvement at the course, program and institutional levels and by providing internal and external constituencies with an accurate and complete understanding of how the institution is advancing its mission.

UASL fulfills its mission by:

- fostering excellence in assessment practices through
 - consultation and support to departments and individuals in their assessment efforts
 - ongoing assessment monitoring
 - coordination of campus-wide and program-level assessments that support the University's quality improvement efforts
- partnering with other University offices to
 - serve as a central clearing house for university data
 - respond to external accountability mandates
 - respond to internal and external requests for information about the University and its programs
- providing evidence of institutional effectiveness by
 - measuring, describing and documenting institutional performance data
 - coordinating accreditation processes
 - initiating and conducting surveys within the University community
 - serving as institutional liaison for the Illinois Board of Higher Education and the Higher Learning Commission
- compiling, analyzing, interpreting and disseminating statistical data to support
 - institutional planning
 - policy-formation
 - decision-making
 - evaluation of effectiveness

Contact the University Assessment and Student Learning Staff at:

Rosemarie_Suhayda@rush.edu

Alison_R_Weston@rush.edu

Research

Research expenditures totaled more than \$100 million last year. Rush University faculty is committed to fostering centers of research excellence that combine basic clinical and translational science of importance to community health. The faculty encourages inquiry into these areas by students ensuring that they become practicing professionals who will continue to learn throughout their careers

Institutional Animal Care and Use Committee

All investigators and instructors that use animals in scientific projects and teaching must submit their plans to the Institutional Animal Care and Use Committee (IACUC) for approval prior to carrying out the project or program. Members of the committee are appointed by the Associate Provost for Research and include representation from the community and from the student body. The Senior Director of the Comparative Research Center coordinates the administration of the IACUC.

Human Investigation

Any project or study involving human subjects must have approval of Rush University Medical Center's Human Subject Protection Program. Studies in the community as well as within the Medical Center must have this approval. The Office of Research and Clinical Trials Administration handles all requests and has established the protocol for proper investigative procedures. For assistance, contact the Office of Research and Clinical Trials Administration by phone at (312) 942-5498.



Rush University/Campus Information

Rush University's Campus

Office of Student Life

Counseling Center

International Services

Campus Housing

Community Service Opportunities

Recreation Opportunities

Student Lounge

Student Lockers

Student Organizations

Voter Registration

Worship Services

Bookstore

General Education Resources

Rush Copying Service

Library of Rush University Medical Center

McCormick Educational Technology Center

Media Services

Rush University 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. New 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, John H. Stroger Jr. Hospital of Cook County, Westside Veterans Administration Hospital and Illinois State Psychiatric Institute, 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 Services Suite, the Office of Student Life, the Rush University Bookstore, a cafeteria and the administrative offices of Rush Medical College, the College of Nursing and the College of Health Sciences. The administrative offices for the The Graduate College are located in the Cohn Research Building, just west of Armour.

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. Directly across the Eisenhower Expressway from the main campus is an office building for 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 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

The mission of the Office of Student Life is to provide an atmosphere that will enhance students' academic experience. The Student Life 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
600 S. Paulina Street, Suite 984
(Armour Academic Center)
Chicago, Illinois 60612
Office: (312) 942-6302
Fax: (312) 942- 9283
Email: Student_Life@rush.edu
Web site address: www.rushu.rush.edu/studentlife

Student Activities

The Office of Student Life 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, Current Issues in Healthcare as well as Fall Into Rush (student organization fair), a student art fair and quarterly Friday afternoon socials known as T.G.I.F.s. In addition, the office encourages student exploration of Chicago's many cultural, educational and social resources by regularly offering discounted museum, theatre, sports and movie tickets. The staff in the Office of Student Life 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 at (312) 942-6302.

Career Development

The Office of Student Life assists students active in the job search and residency application process 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 guide books. Many of these resources are also available on the RUCConnected Portal site. Each student is also assigned an academic advisor. The advisor is knowledgeable about the student's educational program and provides assistance in curriculum selection, academic progression and professional and career development. Within Rush Medical College, an Assistant Dean in the Office of Medical Student Programs has specific responsibility for providing counseling about specialty choice and application for post-graduate residency positions.

Publications

The Office of Student Life 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 RUCConnected Portal site. The 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.

Rush University Counseling Center

Open all year, the Rush University Counseling Center provides professional counseling at no charge to currently enrolled students. Individuals and couples explore a variety of concerns ranging from academic and clinical problems to issues of personal development. Students have sought help for general anxiety, depression, relationship problems, insomnia, career questions, eating disorders, parenting concerns and test anxiety. The Rush University Counseling Center maintains strict standards of privacy and confidentiality. No information about an individual student is released to anyone, inside or outside the University, without the prior consent of the student. No student contact with the Counseling Center becomes a part of any other University record. The Rush University Counseling Center, located in 701 Kidston House, is also reachable via telephone at (312) 942-3687.

Office of International Services

The Office of International Services, located in 440 Armour Academic Center, works with international students, residents, researchers and faculty who are planning to study or to work at Rush and who will need authorization from the United States Citizenship and Immigration Service (USCIS) to do so. Functions of the Office of International Services include:

- Rush representative to USCIS, the Department of State and the Educational Commission for Foreign Medical Graduates (ECFMG) regarding the status of international students, residents, scholars and faculty
- Responsible officer for the Rush J-1 Exchange Visitor Program and Training Program Liaison to ECFMG
- Designated school official for the F-1 student visa program and Student and Exchange Visitor Information System (SEVIS)
- Advising concerning the admission of international students
- Advising regarding the hiring of international faculty and staff
- Consulting with current and potential students, residents, researchers and faculty regarding nonimmigrant and permanent resident issues
- Supervises the issuance of USCIS documents for F-1 students, J-1 Exchange Visitors and H-1B temporary workers to assure compliance with established governmental policies and procedures
- Consulting with academic and administrative offices regarding non-immigrant and permanent residence issues
- Orienting new students and scholars

The Office of International Services is available to serve the needs of international students, as well as other international visitors to the Medical Center. The office provides pre-arrival information, prepares immigration paperwork and provides orientations. For additional information, please call (312) 942-2030.

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, Suite 984, Armour Academic Center. 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, carpeted, have individually controlled heating and air conditioning, modern appliances and bathtubs with showers. Basic cable and internet are included in the rent. Electric and heating are not included in the rent.

Application Process

Students can apply for housing upon their acceptance to Rush University. Applications for both new and returning students are available from the Office of Student Life, Suite 984 Armour Academic Center, or 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 in category number one receive the highest priority followed by those in category number two, etc.

Returning undergraduate, graduate and professional students who apply for on-campus housing by April 15th.

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

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

These priorities will be used as a guide when assigning housing. Returning students who fail to submit a housing application for the succeeding year by April 15th will lose his or her 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 anytime after May 1st.

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 Office of Student Life.

The Office of Student Life 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 and in the Office of Student Life 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.

Community Service Programs

The Rush University Office of Community Service Programs was first established in 1991 to create a thriving network of community service

programs that matched Rush Medical College student interest and initiative with the social and health care needs of the Chicago population. Since then, the program has grown to include all disciplines within Rush University. Students now have the opportunity to participate in clinical and non-clinical community service programs that are administered through this office.

The Office of Community Service Programs' mission is to: 1) assess the need for potential services in the Chicago community that could benefit from the voluntary assistance of Rush students, 2) match these services with the students' desire to be part of an active community service experience, 3) coordinate these activities to the mutual benefit of all and 4) evaluate the effects of community service experiences on the personal learning and development of the students.

Recreation

Rush University students have the opportunity to utilize two recreation facilities in the area and may receive a partial refund for these two facilities. 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. The Union Station Fitness Formula Club, an affiliate of Rush University Medical Center, offers reduced membership rates for students. This full service, state-of-the-art facility, located at the corner of Jackson and Canal Streets, includes a swimming pool, basketball courts, fitness classes, cardiovascular equipment, strength equipment and weights, private women's workout area and a café/juice bar. Rush University students also have the opportunity to use the UIC Student Center West Facility on the University of Illinois at Chicago campus which includes a gymnasium, running track, racquetball and universal weight machines. The UIC Student Center West is located at 828 South Wolcott, lower level. Students presenting a valid Rush University ID card at either the Union Station Fitness Formula Club or the UIC fitness center will be eligible for admission. Students purchasing passes for these two locations may bring receipts to the Office of Student Life (Suite 984 Armour Academic Center) to receive a partial refund. Receipts must be presented for a refund during the academic term in which the membership was purchased. Schedules listing the facilities, rates and hours of operation are also available. Questions regarding the above recreation facilities can be directed to the Office of Student Life at (312) 942-6302.

Student Lounge

The Student Lounge, located on the ninth floor, north end, of the Armour Academic Center is equipped with couches, a wide-screen television, an email workstation, tables and chairs, a copy machine and a complete kitchen (stove, 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. Be advised, however, 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, located at 984 Armour Academic Center.

Student Organizations

The Office of Student Life 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 the student organizations is listed in the *Rush University Student Handbook*, as well as on the Student Life website.

Voter Registration

Voter registration materials are available through the Office of Student Life, 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 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 am - 4:30 pm Monday - Friday, 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 are offered through the center. Personal work of one or more copies can be accommodated for faculty and students at a reasonable fee. Quick Copy 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. In addition to offering a comprehensive collection of print materials, the Library continues to expand and revise a wealth of

online information resources. Visit the Library on the 5th floor of the Armour Academic Center or at <http://www.rushu.rush.edu/library>.

The collection includes materials in a wide range of formats covering all areas of health sciences. The online catalog shows all items available at the Library. Records include an item's location, availability, full bibliographic record and links to web information such as full-text journals when applicable.

The Library's database collection features resources such as MEDLINE and PsycINFO (Psychology), four evidence-based medicine databases and more. Many of the citations found using these databases link to the full-text of the original journal article. Other online resources include point-of-care reference tools like UpToDate and MD Consult. These provide concise topic reviews, clinical guidelines, extensive drug information and full-text for a wide range of medical text-books.

If the Library does not have an item, it can be requested from another library via interlibrary loan or the Illinois' statewide library sharing program (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 lender. For details call (312) 942-5950.

The students, faculty and staff of Rush University Medical Center may access online Library resources such as the full-text journals and databases from off-campus locations by using a special login and password called a proxy. A proxy login is usually an individually designated Rush Network ID. For more information please call (312) 942-5950.

The Reference Department provides personalized information services to all members of the Rush community. Schedule individual instruction at your convenience to learn how best to use MEDLINE, PUBMED, evidence-based medicine databases, bibliographic management tools and many others. Call (312) 942-2274 to make arrangements for individual or course related instruction.

The Reference Department also provides InfoConsults; a one-hour private consultation focused on an individual's specific needs and area of concentration. All InfoConsults and instruction are free. Help is available in person, by telephone, via online chat, or email at Lib_Ref@rush.edu.

McCormick Educational Technology Center (METC)

The McCormick Educational Technology Center (METC), a division of the Library of Rush University Medical Center, is a media and computing center designed to facilitate independent study and self-enrichment through use of computer software and audiovisual (AV) material. The METC also provides support to faculty in the use of instructional technology as a part of their curricula.

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

Included at the METC are 3 group viewing rooms, a 40-workstation computer classroom, a 16-workstation computer classroom, a 10-workstation computer classroom and a computer/AV lab which houses 60 workstations and three scanning workstations. All computer workstations run Windows XP, Office 2007 (Word, Excel, PowerPoint and Access) as well as over 100 applications covering a wide range of specialties. Group viewing room reservations may be made in person at the METC circulation desk, or by calling (312) 942-6799. During hours of operation, AV viewing and computer aided instruction (CAI) software use has first priority over all other viewing room uses, including individual or group study. Faculty may reserve computer classrooms by contacting the Registrar's office at registrars_scheduling@rush.edu. Printing access is available on a per page fee.

The METC is a major Internet access point at the University, providing World Wide Web and email access to all Rush University students. Students have access on a first-come, first-served basis to the computer lab 24 hours a day (with a valid Rush University ID). The department also offers laptop PCs to students for limited checkout.

METC staff assist faculty in locating, previewing and acquiring commercially produced software and media for use within their courses. Help with data collection research forms (e.g. surveys) is available through consultation with METC staff. The METC provides access to a series of Survey Monkey accounts, allowing students and faculty to easily facilitate short-term online survey projects.

The METC provides guidance and assistance in providing instructional technology support to faculty who wish to provide more advanced materials to students. Using products such as Wimba Live Classroom and Camtasia, the METC provides access to methods of both creating

lecture files to post in Rush University's learning management system (LMS), but also to virtual classroom software which allows distance education students to communicate with their instructors, and each other, in real time. The METC collaborates with Information Services (IS) to provide LMS support for both faculty and students.

Media Services

Media Services, located in the west corridor of Armour Academic Center, provides a wide range of audio/visual support for classrooms, meeting rooms and auditoriums throughout the University/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 extension 25187 to reach Media Services.

Rush Photo Group

Rush Photo Group (located at 121 Professional Building I) 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, 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 extension 28278



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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, student life and student community service programs.

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.

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 and faculty identification

cards; fulfilling transcript and credentialing/licensing requests; and providing accessible, reliable, responsive and courteous personal and technological 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

A partial list of behaviors that would subject a student to disciplinary action includes:

- 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; downloading or copying 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

The following section provides definitions of terms regarding the Academic Honesty policy:

- Misconduct refers to any academic or nonacademic behavior that is in violation of the policy stated below.
- Plagiarism refers to any attempt by students to use the work, words or ideas of others without proper attribution, or any attempt to pass off the work, words or ideas of others as their own. Such acts are considered plagiarism whether they occur intentionally or unintentionally. Acts of plagiarism include but are not limited to:

- Presenting any phrase or extracts, verbatim without using quotation marks and without any reference to the author
- Paraphrasing all or part of an author's work and presenting it without any, or with inadequate, reference to the author
- Copying or paraphrasing all or part of another student's work or otherwise presenting another student's work as their own
- Collusion is an agreement or cooperation in order to cheat or deceive for a fraudulent purpose. Collusion applies to students (past, present and future) who intentionally cooperate in order to gain an unfair advantage in the gaining of an award, qualification or grade.
- Cheating is using unauthorized materials, including electronic devices, or obtaining unauthorized help from another person in any work submitted for academic credit.
- Fabrication is inventing information or citations in an academic or clinical exercise.
- Facilitating academic dishonesty is providing unauthorized material or information to another person.
- Unauthorized examination behavior is conversing with another person, passing or receiving material to or from another person or temporarily leaving an examination site to visit an unauthorized site or without permission.
- Disciplinary actions range from warning, probation, suspension or expulsion from the University/Medical Center.
- 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
- Unlawful use or possession of firearms or other weapons
- Attempting to gain access to another's e-mail or computer account, username or password
- Knowingly setting off false fire, safety or security alarms

Inappropriate Degree Usage

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

1. All degree requirements have been successfully completed,
2. A completed Degree Approval form has been submitted to the Office of the Registrar, and
3. 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 for proficiency and/ or achieved prior learning. Rush Medical College does not offer credit for proficiency. Credit for 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 for proficiency will equal the credit value of the course(s) as listed in the RUCatalog under which the student matriculated. Information that is posted on the transcript is the prefix, number and title of the course section along with the grade of "K." Credit for the course will appear in the student's term and cumulative totals as credit earned. Credit earned by this mechanism will not be used in calculating the student's grade point average (GPA). A transcript guide that accompanies all transcripts issued by the Office of the Registrar explains that the K grade means credit was earned through proficiency examination.

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, thesis, 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 3rd- or 4th-year 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, graduate and/or professional (medicine) 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 second grade is computed in the GPA; although both grades remain on the transcript. The GPA is computed by dividing the number of earned grade points by the number of hours of credit attempted for those courses.

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

A grade point average is not calculated for Rush Medical College students since courses are taken under an honors/high pass/pass/fail grading scheme.

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 3 rd - and 4 th -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

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
- Prior degrees earned

Degree Approval

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 RMC)

Commencement

Although Rush University has multiple graduation dates during which degrees are conferred, the University has only one commencement ceremony held in the spring. The exact date for commencement is published in the academic calendar. Students will be notified by the Division of Student Affairs concerning participation in the event. All commencement inquiries should be directed to ru_commencement@rush.edu.

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.

Should a program director feel that an exception should be granted to the commencement participation policy, she or he must appeal in writing to the dean of her or his college. At the same time, the program director must inform the Office of the Registrar that an appeal has been submitted so that the Office of the Registrar can inform the college of any reason why the request should be denied. The final decision rests with the dean of the college. The dean must inform the program director and the Office of the Registrar of her or his decision.

Students whose academic plans change, making them ineligible to participate in the Commencement ceremony, will be then eligible to participate the following ceremony should they successfully meet degree requirements. Students will be notified of all outstanding obligations, and the Office of the Registrar will encumber the diplomas and transcripts of students until these obligations are met.

Awarding of Degrees

Rush University degrees are dated the Saturday following the last week of classes/finals during 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. 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/departmental 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. A current list of prizes and awards is available at <http://www.rushu.rush.edu/acadresources/graduation/prizesawards.pdf>

Thesis/Dissertation Requirements for Graduation

Doctor of Philosophy (PhD) candidates must complete a dissertation. Some master's programs require a thesis to meet degree requirements. Each thesis or dissertation 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 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 or dissertation 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 or dissertation process to the academic community. Public presentation of the thesis or dissertation must precede the final approval by the thesis or dissertation committee.

A copy of the thesis or dissertation must be approved by the Director of the Library of Rush University Medical Center for conformance to publishing requirements and copyright compliance.

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 I-ED-Pod C (312)947-0699.
4. If ECHS is closed, immediately report to Emergency Department (ED) Tower I (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

RUMC Campus Security

312-942-5678

RUMC Emergency Room

312-942-0100

RUMC 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

The minimum requirements under the Illinois College Student Immunization Act (110-ILCS 20) are as follows: Any student whose date of birth is January 1, 1957 or later must submit proof of immunization for:

- Measles (two doses)
- Mumps
- Rubella
- Diphtheria (primary series-two doses)
- Tetanus (adult booster less than 10 year old)

Program-specific health requirements are specified by the college and/or academic program. Students are notified at the time of admission of the health requirements for matriculation into the University.

Students who do not submit the proper proof of fulfilled health requirements by the designated deadline will be prohibited from registering for the next term and from continuing as a student.

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 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, College of Health Sciences, 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

The pass/no pass option is college- and course-specific, as is the proportion of courses that can be taken pass/no pass. The Course Schedule indicates all courses that may 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 last 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

In the first and second years, the official transcript displays the first time a repeated course is taken until the grade is replaced, at which time only the repetition and new grade are displayed. Both the

original course and its repetition are recorded on the unofficial transcript for internal use within Rush Medical College. Since all courses are taken honors/high pass/pass/fail, the GPA is unaffected. In the third and fourth years, all instances of a course are represented on the students' official transcript.

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 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 three months after their graduation.

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 notified one month prior to course removal. It is the responsibility of students to retain course information for their personal use before course removal.

System Availability

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

Students-at-Large

Individuals not admitted to a degree program but who want to enroll in a course may do so by completing the appropriate student-at-large registration form. Students are not allowed to take Rush Medical College courses as a student-at-large.

An instructor is not obligated to accept any student-at-large in his or her class, and students without appropriate background take courses at their own risk. Students in degree programs have priority enrollment over students registering for the at-large-status. At-large students registered for a course may be removed from the course if a degree-seeking student wishes to enroll in the class. If a student cannot be accommodated in a class, a full refund will be issued.

A student may accumulate no more than 12 quarter 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 his or her designate) of the college offering the courses.

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 forms must be submitted with tuition payment or will not be processed.

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.

RUMC 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 Amendment 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 officially begins in which the student is matriculating.

The Armour Academic Center (AAC) building opens at 5:30 a.m. and is locked at 7:00 p.m., Monday thru Friday. On Saturday, the building opens at 8:00 a.m. and is locked at 1:30pm. 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 AAC 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 AAC 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

Previous Institutions

Rush University requires final and official transcripts from all institutions of higher education that a student might have attended, regardless of whether or not a degree was earned. Similarly, Rush University requires an independent evaluation of foreign credentials in the case when a student earned a degree outside of the US or Canada. Rush University accepts independent credential evaluations from Educational Credential Evaluators (<https://www.ece.org>) or World Education Services (<http://www.wes.org>).

Rush University Transcripts

Copies of academic transcripts can be obtained at no cost. The transcript is released only with written consent of the student or as consistent with legal requirements. Transcripts, typically, 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 web site at www.rushu.rush.edu/pdf/files/transrequest.pdf 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 his 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. The numbers of allowable credits transferred for graduate courses is determined by each program or division.

Transfer credit typically will only be accepted from an accredited college/university. Students must submit official copies of their academic transcript to receive review and determination of transfer credit eligibility. 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.

Undergraduate-level courses cannot be transferred to meet the requirements of a course taught at the graduate level at Rush. 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 weeks 2–5: Grade of W will be issued for the course
- Course dropped in weeks 6–end of course: Grade of WP (Withdraw Passing), WF (Withdraw Failing), WN (Withdraw 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 may register to audit the course only 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.

Auditing of laboratory or clinical courses is prohibited. An auditing student is subject to the following conditions:

- May participate in class discussion only at the invitation of the course director
- Is prohibited from being in class when examinations are scheduled
- 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. Dependent on college policy, a student who has audited a course may not apply for credit 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.

Typically, Rush Medical College (RMC) does not allow students to audit RMC courses.

Course Schedule

The Course Schedule is available through the RUConnected web portal at www.rushu.rush.edu/ruconnected. 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 at: www.rushu.rush.edu/pdf/files/indstudy.pdf. 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, 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 RUConnected, located at <http://www.rushu.rush.edu/ruconnected>.

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 forms 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, on an approved leave of absence or who 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 to Withdrawal form, which requires the student to obtain the signatures of specific University offices. 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 to Withdrawal form may be

obtained from the Office of the Registrar or online at: www.rushu.rush.edu/registrar/forms.html.

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 to 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 Petition for Leave of Absence form is submitted to the Office of the Registrar is the date that will be used in processing the form, unless otherwise noted in writing by the program director.

Students who submit 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.

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.

Student Records

Address and Name Change

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.

Address changes can be submitted using an Address Change Request form and submitted to the Office of the Registrar for processing.

Name changes require one of the following documents to be submitted at the time of the request: 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 our 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. In addition, Rush has extended the period of time under which deceased students' education records can be released. If a specific privacy/confidentiality question is not answered in this document, please contact the Office of the Registrar.

Family Educational and Rights Privacy Act of 1974 (FERPA)

FERPA is a federal law designed to protect the privacy of students' education records. Education records include any information or documentation that is recorded in any way, including records produced by handwriting, computer, email, audio and video, among others. 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' education 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 education 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 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

Certain information classified by Rush University as directory information may be disclosed to the public without obtaining the student's permission. The items classified as directory information include:

- Student's full name
- Local and permanent addresses
- Local and permanent phone numbers
- Pager number (only relevant for third- and fourth-year medical students)

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

* 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 or electronic image to the representation, marketing or promotion of Rush activities only.

Students may restrict the release of any item of information considered directory information by completing and submitting the Directory Information Restrictions form available in the Office of the Registrar (or online at: <http://www.rushu.rush.edu/registrar/forms.html>).

The decision to restrict directory information will apply to all requests for directory information from within and outside the University community, including prospective employers. These restrictions will remain in effect until the Office of the Registrar is informed in writing to remove the restrictions.

Annual Notification of Student Rights under FERPA

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

The right to inspect and review the student's education records within 45 days of the day the University receives a request for access.

Students should submit to the 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 right to request the amendment of the student's education 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 and specify why it is inaccurate. 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.

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 or 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.

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

Education Records

Rush University does not maintain education records in one central office. Education records are maintained in the Office of the Registrar and in the respective college and department offices. Other education 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.

Students should obtain copies of transcripts from previously attended colleges or universities from the institution that holds the original records. Rush University will not issue copies of transcripts from previously attended colleges or universities. Other portions of a student's record will be copied upon request. The request must be in writing and signed, must specifically identify the record desired and include the student's major, year, date of birth and Social Security Number. There is no charge for a copy of the student's Rush transcript. Other reproductions cost 75 cents per page. The University honors requests providing there is no outstanding obligation to Rush University/Rush University Medical Center. Students within commuting distance may be asked to review the desired information in person. Requests for information are kept with the records.

Deceased Student Records

Rush University does not permit the release of education record information of a deceased student until 25 years after his or her death unless required by law and/or authorized by the executor/administrator/executrix/administratrix of the deceased student's estate or parents, or next of kin, if an executor/administrator/executrix/administratrix has not been appointed. Inquiries to this policy should be made to the Office of the Registrar.

Mailing Lists

Rush University does not release the names, addresses, phone numbers or email addresses of its current or former students as mailing lists unless required to by law (i.e., the 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, 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 (2012–2013)

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 located in the Rush University Catalog, 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 Services.

Students have the responsibility to complete one or a combination of the following courses of action on or before the announced first day 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 one-third tuition, all fees and a \$15 service charge be paid on or before the first Friday of the term. Additional payments of one-third are due on the fourth and eighth Mondays of the term. Contract forms are available in the Office of Financial Affairs.
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 of the specified due dates will have until Friday of that week to satisfy their financial obligations without penalty. Failure to do so 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 students must show proof of existing coverage and sign a health insurance waiver form before registering for the Fall term each year. Students who do not sign and submit a health insurance waiver will not be allowed to register. To that end, students enrolled in degree programs are eligible for the Student Health Insurance Plan offered by Collegiate Risk Management, Inc. and People's Benefit Life Insurance Company unless they show proof of coverage under a similar plan.

For the 2012–2013 school year, the cost of the plan is approximately \$273 per month for single coverage. Additional coverages are available as follows: child (additional \$25.00 per month), children (additional \$789.00 per month) and spouse (additional \$646.00 per month). This plan allows students to choose a primary care physician from a large list of members of the Preferred Provider Plan (PPD) in the Greater Chicago area. Provider listings, including a listing of preferred care pharmacies, can be found at www.multiplan.com. There is an annual deductible of \$500 and coverage of 80 percent for most patient services including hospitalization and surgery, as well as outpatient services such as office visits, mammography, laboratory and X-ray. 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.

A dental insurance plan is also available and optional to all Rush University students. Details of the plan and lists of member physicians and hospitals 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 Plan Rates for the 2012–2013 Academic Year

Medical	Approx. Monthly Rate
Student	\$273
Student +Spouse	\$646
Student + Child	\$525
Student + Children	\$789

Dental	Approx. Monthly Rate
Student Plan	\$19.04
Student + One Plan	\$37.32
Family Plan	\$71.18

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

Effective with the spring 2013 term, Rush Medical College students follow the below tuition refund policy. Prior to spring 2013, Rush Medical College students will not be refunded any portion of tuition when withdrawing or being dismissed from the University.

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

Students enrolled in the College of Nursing, College of Health Sciences or The Graduate College who are attending Rush for the first time and

who withdraw during their first term are entitled to a prorated refund of tuition and fees through the fifth week of attendance. Refunds will be shown as credits on the student's account unless the student requests a check for the amount of refund, less any amount still owed for other charges. Normally, checks are processed within two weeks and mailed to the student's address on RUCConnected. 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 The Graduate College Courses

Rush Medical College students who take a leave of absence from their MD program may enroll in The 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 their account, it is his or her 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 sent to all newly accepted students via email 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 May 1st. 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. Grant assistance is available. 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 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 College Work Study program may be possible throughout Rush University Medical Center. Depending on a student's academic program, Federal College Work Study 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 most

university students. 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 the full spectrum of Veterans Education Benefits through the US Department of Veterans Affairs. Please click the links associated with each bullet for full program details and payment rate information.

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 \$17,500 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, Rush University participates 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 \$17,500 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 page.

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 you qualify for participation in more than one Veterans Education Benefits program, the VA website provides a [comparison tool](#) to help you determine which benefits might be right for you.

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

1. First-time using VA Education Benefits at all? Apply for benefits through the VA: If the veteran has never used their veterans benefits at an institution before, this step must be completed.
2. First-time using VA Education Benefits at Rush? 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. First-time veterans at Rush University must 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 our office. Please be sure to indicate your 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
Undergraduate Students	12	6

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 College 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 and are first effective for the Summer 2012 term—the previous SAP policy is in effect until then. 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 in.

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 in.

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 US Department of Education for financial assistance at a specific number of credit hours. Regardless of a student's actual plan of study, maximum timeframe is calculated using the number of hours for which the program was approved with the US 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 (RMC) 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 timeframe 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 RMC 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 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 RMC 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 US 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 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 US Postal Service) and through their Rush email account.

Appealing Suspension of Financial Aid Eligibility

A student may appeal the suspension of their 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 her or him 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 she or he 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 she or he meets the requirements for reinstatement.

	FA 12	WI13	SP 13	SU13
College of Nursing	*8/10/12 8/27/12	N/A	*11/9/12 12/17/12	TBD
College of Health Sciences	*8/10/12 8/27/12	*11/9/12 12/17/12	*3/2/13 3/11/13	TBD
The Graduate College	*8/10/12 8/27/12	*11/9/12 12/17/12	*3/2/13 3/11/13	TBD

*Priority Deadlines

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 prepay tuition. Books and fees are not included in the prepayment cost.

A copy of the letter of acceptance from the Rush University must be turned into the LEAP office at the beginning of the LEAP prepay assistance. The LEAP paperwork must be turned into the LEAP office before the final deadlines listed below. 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 quarter, to withhold taxes based on this Federal tax law, Section 127.

Tuition and Fees (2012–2013)

Tuition and fees for the 2012–2013 academic year are listed below. For estimates of other expenses, see the Office of Student Financial Aid web site.

College of Nursing	Flat Rate (per term)	Per-Credit Rate
Tuition, All Nursing Academic Programs	\$10,744 (12+ credits)	\$944 (1–11 credits)
Tuition, RN First Assist (RNFA) Course Series	N/A	\$700
Tuition, GEM Students Graduating in Spring 2013 Only	\$8,058	N/A
Technology Fee (New Incoming Students)	\$50.00	N/A
Course Fees NSG 531, 532 and 533 (New Incoming Students, Web Version Courses–Online Proctoring)	\$100.00	N/A
Course Fee NSG 500 (New Incoming Students, SNA Membership–2 years)	\$80.00	N/A
Course Fee NSG 501P (New Incoming Students)	\$50.00	N/A
The Graduate College	Flat Rate (per term)	Per Credit Rate
Biotechnology	\$9,442	N/A
Health Sciences (PhD)	N/A	\$600
Nursing (PhD) –Trimester	\$10,744 (12+ credits)	\$944 (1–11 credits)
All Other Graduate College Academic Programs	\$5,580 (12+ credits)	\$465 (1–11 credits)
College of Health Sciences	Per Credit Rate (Unless Otherwise Noted)	
Undergraduate Programs		
Imaging Sciences	\$541	N/A
Medical Laboratory Science	\$520	N/A
Perfusion Technology	\$586	N/A
Respiratory Care	\$557	N/A
Vascular Ultrasound	\$543	N/A

Tuition and Fees (2012–2013)

Tuition and fees for the 2012–2013 academic year are listed below. For estimates of other expenses, see the Office of Student Financial Aid web site.

Graduate Programs		
Audiology	\$593	N/A
Clinical Laboratory Management	\$578	N/A
Clinical Nutrition	\$670	N/A
Health Systems Management	\$656	N/A
Medical Laboratory Science	\$578	N/A
Occupational Therapy	\$567	N/A
Perfusion Technology	\$629	N/A
Physician Assistant Studies (1 st Year Students)	\$621	N/A
Physician Assistant Studies (2 nd Year Students)	\$8,073/term	N/A
Physician Assistant Studies (3 rd Year Students)	\$6,210/term	N/A
Research Administration	\$575	N/A
Respiratory Care	\$592	N/A
Specialist in Blood Bank	\$578	N/A
Speech-Language Pathology	\$592	N/A
Rush Medical College*	Per Term	Per Year
M1	\$24,186	\$48,372
M2	\$23,928	\$47,856
M3	\$23,928	\$47,856
M4	\$15,952	\$47,856
Students-at-Large See per-credit rates listed above		
Continuous Enrollment Fee	Per Term	
M1	\$4,170	
M2	\$2,874	
M3	\$3,120	
M4	\$2,080	
All Other Programs	Students are charged at the per credit rate equivalent to one quarter hour for their programs.	

Tuition and Fees (2012–2013) (cont.)

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

A \$150 enrollment deposit is required for students in the College of Health Sciences undergraduate degree, certificate programs, clinical nutrition/dietetic, medical laboratory sciences, perfusion technology, research administration, respiratory care and imaging sciences program. The enrollment deposit for audiology and speech-language pathology students is \$200. The enrollment deposit for health systems management and occupational therapy students is \$250. Students in the Physician Assistant Studies program must submit a deposit of \$300. Rush Medical College students are required to pay \$100 prior to matriculation. College of Nursing students and affiliated students must deposit \$300 prior to matriculation. Students in The Graduate College PhD in health sciences program must pay a \$150 enrollment deposit. The enrollment deposit for PhD in nursing students is \$300, while the enrollment deposit for all basic sciences and biomedical research programs within The Graduate College is \$250. 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.

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 the Registrar and 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.

Rush University Rush Medical College



Welcome to Rush Medical College!



Welcome to Rush Medical College, a world of over 2,600 faculty and staff, 525 medical students and 620 residents and fellows. Rush Medical College encompasses the Office of Medical Student Programs, the Office of Graduate Medical Education and the Office of Continuing Medical Education.

At Rush, learning is an active process in which each student is given opportunities to achieve the highest potential. The interaction between student and faculty member mirrors the interaction between patient and physician: an open dialogue and mutual concern for problems. A Rush medical education is the first step in a lifetime pursuit of knowledge and achievement of the highest quality of patient care.

Thomas A. Deutsch, MD
Henry P. Russe, MD,
Dean of Rush Medical College

Rush Medical College: Philosophy

The process of becoming a physician is unique for each student who enters Rush. Each brings to his or her medical school experience a distinct educational, psychological and social background. As students define career goals, each develops personal ways of coping with the demands imposed by the physician's role. The Rush Medical College curriculum encourages pursuit of individual interests by emphasizing a solid foundation in the basic sciences and by offering a wide range of elective opportunities in the Medical Center and in a network of affiliated and associated hospitals.

Throughout the program, students are encouraged to develop habits of self-education and enthusiasm for the lifelong study of medicine according to specific interests and objectives. Students are assigned advisors whose responsibilities are to provide guidance and to serve as resources for students as they define professional goals and deal with a variety of issues during their progress through medical school.

Long after students have taken their last medical school examinations, the sense of responsibility for the welfare of their patients remains the most important stimulus to maintaining the highest level of professional performance. The Rush faculty seeks to provide educational opportunities and to create an environment that will foster the ability to meet these responsibilities with competence and compassion.

Rush Medical College: Mission and Terminal Objectives

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.

Domains of Terminal Objectives:

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

Rush Medical College: Teacher-Learner Relationship

Expectations for the Teacher-Learner Relationship

Rush Medical College has a long-standing tradition of valuing and creating a productive and positive learning environment for its students—this environment is an institutional asset that is vital to carrying out our missions in teaching, patient care and research. The relationship between teachers and learners should be based on mutual trust, respect and responsibility. The expectations for maintaining a professional teacher-learner relationship are relevant

to all faculty, residents, staff and students who participate in educational activities in the classroom, laboratory, research or clinical settings where there is a focus on education, patient care and ethical conduct.

Expectations for Learners

Students are expected to participate in the learning process in an active, respectful and professional manner. Students' motivation and actions should be appropriately directed at gaining the knowledge, skills and values that are required to become a competent, ethical and compassionate physician. This includes the following:

- Being adequately prepared for learning activities in the classroom, laboratory, research and clinical settings
- Treating faculty, residents, staff and fellow students with respect and collegiality
- Actively and appropriately seeking information to improve their own performance
- Reflecting on their performance and educational experiences to inform their self-directed learning and study
- Adhering to the tenets of the University Statement on Student Conduct and the University Statement on Academic Honesty, as well as the student-authored Student Honor Code
- Resolving conflict in an appropriate and professional manner
- Providing constructive feedback and evaluation about their learning experiences

Expectations for Teachers

Teachers are expected to participate in the learning process in an active, respectful and professional manner. Faculty, residents and staff who work with students and residents are charged with helping these learners to become competent, ethical and compassionate physicians. This includes the following:

- Being adequately prepared for learning activities in the classroom, laboratory, research and clinical settings
- Treating learners and fellow teachers with respect and collegiality
- Providing learners with clear expectations for performance and, when applicable, a detailed, written outline of course objectives and expectations
- Providing learners with ongoing, specific and constructive feedback about their performance
- Reflecting on their teaching to inform their own self-directed learning and study

- Actively participating in the development and improvement of courses and their content
- Timely completion of fair and accurate evaluation of student performance
- Holding students accountable to the tenets of the University Statement on Student Conduct and the University Statement on Academic Honesty, as well as the student-authored Student Honor Code
- Resolving conflict in an appropriate and professional manner
- Utilizing feedback and evaluation to improve their teaching

Behaviors that Undermine Productive Teacher-Learner Relationships

It is the policy of Rush Medical College that behaviors that undermine productive teacher-learner relationships such as violence, sexual harassment, discrimination and abuse must never be tolerated. Student abuse may be verbal, psychological or physical. It includes, but is not limited to, sexual harassment, discrimination due to age, racial and ethnic background, religion, national origin or disability. It is understood that all personnel will treat students in a collegial and professional manner. Other types of behavior can be inappropriate if the effect interferes with professional development. Behaviors such as making demeaning or derogatory remarks, belittling comments or destructive criticism fall into this category.

Student abuse includes but is not limited to treating students in a harmful, injurious or offensive way; attacking in words, speaking insultingly, harshly or unjustly to or about a student;¹ reviling or demeaning a student; or otherwise undermining the self esteem or confidence of a student. Sexual harassment includes but is not limited to: offensive comments to or about the student; unwanted attention or unwelcome verbal advances; unwanted persistent invitations; unwelcome, explicit propositions; offensive displays; offensive body language; unwanted physical advances; and/or sexual bribery.² Abuse and harassment create a hostile environment in which to work, and are also addressed in the *Rush University Medical Center Policies and Procedures*. It is understood that incidents of abuse or harassment may cover a spectrum from flagrant to ambiguous. The abuser may be a member of the faculty, a resident, a nurse, another student, a member of the administration, a hospital employee or even a patient. Examples of inappropriate behaviors are:

1. Physical punishment or physical threats
2. Sexual harassment
3. Discrimination based on race, religion, ethnicity, sex, age, sexual orientation or physical disabilities

4. Repeated episodes of psychological punishment of a student by a superior (e.g. public humiliation, threats and intimidation or removal of privileges)
5. Grading used to punish a student rather than to evaluate objective performance
6. Assigning tasks for punishment rather than educational purposes
7. Requiring the performance of personal services
8. Taking credit for another individual's work
9. Intentional neglect or intentional lack of communication

While providing critique is part of the learning process, in order to be effective and constructive, it should be handled in a way to promote learning and maintain a positive learning environment. Feedback should focus on behavior rather than personal characteristics.

Procedures for Reporting Allegations of Mistreatment

The reporting and resolution sections of this policy are designed to protect students from retaliation and to protect those charged with abuse from unfair accusations. The name of the student, the reporting individual and the alleged abuser will be held in strict confidence on a need-to-know basis.

An incident of abuse may be reported by the student or by an individual who witnessed the incident of abuse. An incident can be reported directly to the Office of Medical Student Programs. An incident reported to a trusted faculty member, a class officer, a member of academic administration or a friend should be reported to the Office of Medical Student Programs.

A complaint of harassment may be submitted either orally or in writing to the Office of Medical Student Programs by an individual who claims to have been harassed (the complainant) or by a faculty advisor, a member of the administration or another person authorized by the complainant to act on his or her behalf. The complaint should be submitted within 180 days after the alleged harassment occurs. However submitted, the complainant's name and specific allegations must be provided for further processing to occur.

If the complaint of harassment is submitted by someone other than the complainant, the individual submitting the complaint shall be informed of the policies against harassment and retaliation and shall be advised that:

1. The complaint cannot be processed further without the complainant's specific consent and
2. The complainant should contact the Office of Medical Student Programs if he or she wants to proceed.

Procedures for Resolution of Mistreatment Allegations

Reported incidents will be reviewed with the student(s) involved in the situation to determine their level of commitment and concern in pursuing a report.

In every case where the complainant wants to proceed with a complaint, the Office of Medical Student Programs shall inform the complainant of the policies against harassment and retaliation and shall advise the complainant of the following options to promote internal resolution of a complaint:

1. Informal Resolution

The Office of Medical Student Programs or its designee will attempt to resolve the complaint through informal methods, including but not limited to discussion with the accused (with or without identifying the complainant) and appropriate administrative staff; discussion with the complainant; and/or, if all parties agree, mediation of the complaint involving the participation of the complainant, accused and appropriate administrators. No complaint may be terminated through informal methods without the voluntary consent of the complainant.

2. Formal Investigation and Resolution

In the event the complaint is not resolved informally and the complainant wishes to proceed, a formal investigation will be undertaken by the Office of Medical Student Programs, involving Faculty Council and the Dean of Rush Medical College. The investigation will be handled confidentially to the extent possible, but the Office of Legal Affairs shall be kept advised as necessary.

Prohibition Against Retaliation

This policy prohibits any individual from engaging, whether directly or indirectly, in retaliatory conduct against an individual who brings a complaint or provides information during an investigation of such a complaint. Retaliatory conduct is conduct that adversely and unjustifiably affects the terms and conditions of another's education status, quality of life or education experience and that is motivated by an intent to cause harm because of the targeted individual's involvement in the filing or investigation of a complaint about mistreatment. Students who believe that retaliatory actions have been taken against them because they have filed a complaint or provided information related to a complaint should communicate their concerns immediately to the Office of Medical Student Programs.

References

1. Silver, HK, Glick, AD. Medical student abuse. *JAMA*. 1990. 263: 527-532.
2. Komaroy, M, Bindman, AB, Haber, RJ, Sande, MA. Sexual harassment in medical training. *NEJM*. 1993. 328: 322-326.

Acknowledgement

Sections of this policy have been adapted from the teacher-learner relationship policies from the UMDNJ New Jersey Medical School, Drexel University School of Medicine and Georgetown University School of Medicine and from the Rush University Policy and Procedures Concerning Sexual and other Harassment.

Special Committee on the RMC Environment

The Special Committee on the RMC Environment (SCORE) is up and running. While student mistreatment is rare, any occurrence is unacceptable and inconsistent with the Rush policy of zero tolerance of student mistreatment as described in the *Rush Medical College Teacher-Learner Relationship*. SCORE will review all reports of student mistreatment. Dr. David Ansell, the Rush University Medical Center Chief Medical Officer, will work with SCORE to ensure all reports of student mistreatment are addressed. SCORE will also provide education to the RMC community to promote a positive learning environment.

What should you do if you experience or witness mistreatment?

If you experience or witness mistreatment of a student by another student, faculty, a resident or member of the staff, please contact one of the SCORE members or Dr. Ansell directly. Dr. Ansell can be reached in any of these ways:

- Office: (312) 942-6706
- Pager: (312) 942-6000, pager 9024
- Email: David_Ansell@rush.edu

Rush Medical College: Admissions Process

Applying to Rush Medical College

Rush Medical College utilizes a centralized online application processing service, American Medical College Application Service (AMCAS), for its primary application. Detailed information and application materials are available at www.aamc.org.

Association of American Medical College
2450 N Street, NW
Washington, DC 20037-1126

Every applicant who submits an application through AMCAS to Rush Medical College will receive a Supplemental Application Invitation by email. Once AMCAS has notified the Office of Admissions that an applicant has applied to Rush Medical College, an initial contact email with all information necessary for starting the secondary application process will be emailed. Applicants may submit the supplemental application between July 1 and December 31. The supplemental application requires a nonrefundable fee of \$75.00, which may be waived if the applicant has been granted the [AMCAS Fee Waiver Program](#). The Supplementary Application requires two individual letters of recommendation, one of which must be from an individual whom has had substantial contact with the applicant within the 24 months preceding the application, or an undergraduate Committee Letter. The deadline for filing AMCAS is November 1, and the Rush Supplemental Application and all supporting documentation December 31. All applications are completed electronically.

MCAT

Applicants to Rush Medical College must complete the MCAT exam no later than September 2012 for the 2013 admissions cycle. Applicants may submit MCAT scores from up to three years prior to matriculation. Beyond that period of time, an applicant is required to retake the exam. For more information on the MCAT, please visit www.aamc.org/students/mcat/start.htm.

Applicants must have completed 90 credit hours (using the AMCAS methodology) prior to matriculation from an accredited four-year degree-granting U.S. or Canadian college or university. A baccalaureate degree is not required but is strongly preferred by the Committee on Admissions. The undergraduate major of applicants is not a factor in admission decisions by the Committee on Admissions.

Selection Factors

Rush Medical College is strongly committed to the selection of individuals who will become vital members of the medical community as students, practitioners, educators and researchers. Therefore, applicants are selected on the basis of multiple factors. Throughout the curriculum, emphasis is placed on the preparation of physicians who will function chiefly as medical practitioners and who will be committed to the delivery of quality health care to a variety of populations, including those now underserved.

Admission is granted to applicants on a rolling admissions basis throughout the year. Because Rush seeks to educate and train physicians who will be committed to meeting society's health care needs, the Committee on Admissions seeks excellence in academic

achievement and values, individual goals, personal accomplishments and related experiences. The Committee looks for individuals who exhibit social and intellectual maturity, personal integrity, empathy, professionalism and motivation for medicine. A personal interview is a vital part of the admissions process. All interviews are conducted on-campus and are granted at the discretion of the Committee on Admissions.

The following attributes, behaviors and characteristics are valued in the selection of candidates for admission. The candidate should:

- Demonstrate the value of community service evidenced by ongoing engagement and experience in programs over the past three to five years.
- Display leadership abilities as demonstrated by experiences during and since their undergraduate program.
- Exhibit high moral character and solid judgment as expressed in the AMCAS application and in the LORs.
- Embrace diversity demonstrated by involvement, participation and interaction in experiences within various cultures, settings and/or communities different from their own.
- Show a commitment to the field of medicine with experiences that serve people and/or patients and knowledge of medicine demonstrated by participation in cocurricular activities related to medicine.
- Show excellence in academic achievement.
- Additional facets of the applicants' experiences that are important to the selection include but are not limited to:
- Previous health care experiences and/or employment
- Research experience
- Self-reflection, insight and judgment
- Fluency in other languages
- Time spent in another career
- Teaching

Because of the variety of undergraduate programs and experiences that our applicants possess, Rush Medical College no longer considers a list of courses a reasonable expression of requirements for the medical college academic program.

Required Criminal Background Check

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." Rush Medical College currently uses the centralized Criminal Background Check Service for accepted applicants through the AMCAS to satisfy this Illinois requirement. For more information visit AMCAS at www.amcas.org

Policy Regarding Applicant Misrepresentation

We expect our applicants to be completely truthful in every aspect of their application to medical school. An application includes the full AMCAS application, Rush Secondary Application, two letters of recommendation and a completed Signature Form. If we suspect that there is a misrepresentation on your application, we will first give you a chance to explain the discrepancy. If your explanation does not adequately assuage our concerns about the misrepresentation, we will notify AMCAS of the discrepancy in accordance with its [Policies and Procedures for Investigating Reported Violations of Admission and Enrollment Standards](#). We reserve the right to revoke an offer of interview or of admission if a misrepresentation has occurred.

Technical (Non-academic) Standards for Admission and Promotion

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 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. Please refer to the RUSDAT section of this Catalog.

Rush Medical College: Academic Program

Organization

The four-year Rush curriculum provides an appropriate background for individuals with a diversity of professional career goals. The curriculum is based on establishing a solid foundation in the basic sciences and clinical medicine through a core of required preclinical and clinical courses.

Curriculum: First and Second Years

MI 2012–2013 Integrated Block Curriculum

Curriculum: First Year

The M1 Basic Science content is integrated into seven blocks taught in sequence through the academic year. Those seven blocks are:

Cell and Molecular Biology Block	RMD-510
Musculoskeletal Block	RMD-512
Cardiovascular and Pulmonary Block	RMD-513
Immunology and Hematology Block	RMD-511
Gastrointestinal System and Metabolism	RMD-514
Genitourinary Block	RMD-515
Central Nervous System/Head and Neck	RMD-516
Blocks are aligned with Physicianship program	
Physicianship Program I	RMD-531
Physicianship Program II	RMD-532

Curriculum: Second Year

The M2 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. The Physicianship Program continues to complement the courses listed.

Mechanisms of Disease	RMD-523
Diseases of the Cardiovascular and Respiratory Systems	RMD-524
Diseases of the Genitourinary Systems	RMD-525
Diseases of the Central Nervous System	RMD-526
Gastrointestinal, Liver and Metabolic Diseases	RMD-527
Hematology, Dermatology and Musculoskeletal Disease	RMD-528
Physicianship Program IV	RMT-504
Physicianship Program V	RMT-505

Grading

Students will receive a grade of honors, pass, fail or incomplete for each of the blocks. The Physicianship Program is graded pass/fail.

Curriculum: Third and Fourth Years

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

Students must take and pass Step I of the examinations offered by the United States Medical Licensing Examination/National Board of Medical Examiners (USMLE/NBME) before beginning core clerkships. Prior to the start of the third year, students participate in an intensive orientation to clinical skills.

A minimum of 78 weeks of clinical experiences is required for graduation. The curriculum includes 50 weeks of required core clerkships in internal medicine, neurology, pediatrics, psychiatry, obstetrics/gynecology, surgery, emergency medicine, ambulatory medicine and a required senior sub-internship. The remaining 28 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. The clinical experiences primarily take place at Rush University Medical Center and the John H. Stroger Hospital of Cook County. Of the 28 weeks of required student-chosen electives, up to 12 weeks of elective study may take place at other LCME- or ACGME-accredited institutions. A maximum of eight weeks of elective rotations may be taken in a single subspecialty.

Students request a schedule of required core clerkships through a lottery system. Third-year students are provided with a clinical skills assessment experience with standardized patients. This experience is

designed to aid in self-evaluation of one's clinical skills (communication and interpersonal skills, attitudes and procedural skills).

Academic Policies

Please refer to the policies of the Committee on Student Evaluation and Promotion (COSEP) for detailed academic policies.

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.

Communication Concerning Student Performance

Course directors notify a representative from the Office of Medical Student Programs (OMSP) of any student having academic difficulty or professionalism issues at the earliest possible time.

Professionalism Standards

Please see the COSEP policies and procedures for details about the Narrative Evaluation Form and Professionalism Evaluation Form.

A professionalism standard is included in the Physicianship Course Fact Sheet and the Common Core Syllabus for the M3 clerkships and the Common Syllabus for the Sub internships.

Notification of Grades

Please see the COSEP policies and procedures for details about notification about grades

Recording of Grades

1. *Office of Medical Student Programs (OMSP) records.* Please see the COSEP policies and procedures for details about OMSP records.
2. *Transcripts.* Please see the COSEP policies and procedures for details about transcripts.
3. *Medical Student Performance Evaluation (MSPE).* Please see the COSEP policies and procedures for details about the MSPE.

Definition of Student Status

The status of a student shall be determined in accordance with these rules by the OMSP or the COSEP. All statuses shall be recorded on the

transcript. Please see the COSEP policies and procedures for details about student status.

Changes in student status are all recorded on the transcript.

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

Suspension. Suspension is the administrative termination of the enrollment of a student for a specific period of time.

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 quarter of enrollment. If the student withdrew subsequent to the first quarter, the student must submit a written petition to the COSEP for reinstatement.
2. A student who fails to engage for courses 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 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 as set forth in subsection (a) above.

Advancement to M-3 status. Please see the COSEP policies and procedures for details about advancement to M-3 status.

Advancement to M-4 status. Please see the COSEP policies and procedures for details about advancement to M-4 status.

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.

Student Performance Assessment in a Course

Performance evaluation. Please see the COSEP policies and procedures for details about performance evaluation.

Absences from Examinations. Please see the COSEP policies and procedures for details about absences from examinations.

Failed courses in first and second years. Please see the COSEP policies and procedures for details about course failure.

Status of students with course failures. Please see the COSEP policies and procedures for details about the status of students with course failures.

Academic Dismissal

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

Remedial Programs

First and Second Years

COSEP will establish requirements for remedial work for students with one or more 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: Summer tutorial study with re-examination, retaking failed courses during the next academic year and retaking all courses including those satisfactorily passed. In developing requirements, 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 remainder of his or her college program.

Third and Fourth Years

A failure in a required core clerkship must be made up in a manner prescribed by the course director in consultation with the Office of Medical Student Programs, approved by COSEP and consistent with the reasons for the student's failure. A student required to repeat clinical work in a required core clerkship must complete the failed course prior to beginning another core rotation.

Failure to Pass Step I of United States Medical Licensure Examination

All students must take Step I of the USMLE at the completion of their second year. Permission to defer taking this examination must be granted by the Office of Medical Student Programs. Students who defer Step I beyond the established deadline must defer clinical rotations. COSEP will review all students who do not successfully complete USMLE Step I within nine months of completing the M2 year. Students who fail the USMLE Step I three times will be automatically dismissed.

Student Misconduct

Rush Medical College's Committee on Student Evaluation and Promotion (COSEP) is charged with investigating and adjudicating

charges of student misconduct of a nonacademic nature including but not limited to violation of commonly accepted ethical standards of an academic community, such as cheating and plagiarism; falsification of student records, transcripts, financial aid forms or applications; unlawful use or possession of controlled substances on the Medical Center campus; conviction of a crime deemed serious enough to render the student unfit to pursue his or her profession; or other conduct inconsistent with generally accepted standards of behavior within an academic community or the medical profession. All charges of student misconduct of a nonacademic nature will be presented to the Associate Dean for Medical Student Programs. Student misconduct can also be reported to the Honor Code Council and be investigated through the Honor Code Council Policies and Procedures.

Student Honor Code and Academic Honesty

Rush Medical College students affirm their commitment to the Rush University Honor code. This code is consistent with our aspirations as future physicians to uphold values of responsible and professional behavior and honesty in dealing with academics, patients and colleagues.

This Honor Code sets the standards for expected behavior and professionalism at Rush Medical College. Commitment to these standards is expected of all matriculating students and represents a commitment to our future as successful physicians. This commitment is a shared responsibility of faculty, staff and students in the Rush University community to ensure the highest standards of behavior, whether this is in the classroom or in the clinical setting.

In recognition of the responsibility to uphold these standards, a student, faculty member or staff who becomes aware of or suspects a violation of the Honor Code should follow the guidelines below:

1. Either approach the individual who possibly violated the Honor Code directly with regard to the particular concern in order to eliminate misunderstandings or report it to the Chair of the Honor Code Council who will investigate the incident.
2. Allegations with merit should be documented by the individual who suspected the violation via the Honor Code Alleged Violation Form, which is submitted to the Honor Code Council. The Honor Code Council will consist of eight students (two students from each class), elected in January of the M1 year, who serve 3½ years, as long as the elected student remains in good academic standing. The Honor Code Council will elect one student chair by majority vote in September of each year. The Assistant Chairman of COSEP and a member of OMSP will serve as nonvoting faculty mentors for the Honor Code Council.
3. It is the right of all individuals alleged to have violated this Honor Code to contest the accusation(s) in a meeting with the Honor Code Council. After the Honor Code Council has met with the person(s) who initially presented the concern, the individual said to have violated the Honor Code will be interviewed separately in order to document all perspectives on this issue.
4. Based on majority vote, the Honor Code Council will prepare a written statement on the validity of the charge(s) and a proposed resolution, which will then be submitted to the COSEP. A copy of this written statement will also be provided to the student who was accused of violating the Honor Code.
5. The COSEP will verify whether appropriate procedures were followed and determine the appropriate action based on the items submitted.

Please see the "University State on Academic Honesty" in the "Academic Resources and Policies" section of the catalog.

Advisor Program

All Rush Medical College students are assigned a transition advisor at matriculation. Transition advisors are selected from faculty and staff who teach in the M-I program. The advisors are informed of current policies, procedures and trends affecting students' participation in curricular and noncurricular aspects of medical school by the Director of the advisor program, who is responsible for program planning, coordination and evaluation.

Students meet with their transition advisors throughout the first two years of medical school in group and individual settings to facilitate their adjustment to all aspects of medical school. Students are assigned a clinical advisor in their third year. These advisors are clinical faculty who meet individually with student to assist with development of plans for residency specialty choice and preparing for the residency match.

Student Research Opportunities

Students are encouraged to have some research experience while they are in medical school. The 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 summers or during the time allotted for elective experiences. The Assistant Dean of Student Life in the Office of Medical Student Programs will assist in arranging for research experiences.

Rush Medical College also offers two more formal programs for medical students to become involved in research while in medical school.

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

The Dean's Office Summer Research Fellowships are offered on a competitive basis to students between the M-1 and M-2 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 M2 year on their research project. Many students continue on and participate in these projects after the summer.

For students who are interested in a more in-depth research experience, a leave can be granted from the medical college curriculum to pursue an MS or PhD degree.

Graduation Requirements

The following are prerequisites to the granting of the degree of Doctor of Medicine by Rush University: The level of achievement required by the faculty for the degree of Doctor of Medicine (MD) must be attained in a minimum of 35 months. A minimum of 78 weeks of instruction at Rush Medical College is required for students entering at the third-year level from other medical schools.

Each student's progress in each year of the Rush Medical College curriculum will be evaluated by the Committee on Student Evaluation and Promotion.

Requirements for Graduation:

- To be eligible to graduate, a student must have successfully completed the studies of each year of the medical college curriculum or its equivalent in accordance with the requirements of the medical college.
- The student must pass USMLE Step I Examination.
- Beginning with the entering class of 2008, to be eligible for graduation, the OMSP must receive a passing score from the student on the USMLE Step II Clinical Knowledge and Clinical Skills examinations by graduation per the dates set by the OMSP guidelines.
- The level of achievement required by the faculty for the degree of Doctor of Medicine must be attained in a maximum of 60 months from matriculation.
- Credit toward the MD degree may be granted to a student by the Office of the Dean for appropriate coursework accomplished prior to matriculation at Rush Medical College with approval by the COSEP and the OMSP.
- A minimum of 78 weeks of clinical instruction must be taken according to Rush Medical College rules by students entering at the third-year level from other medical schools.
- The COSEP may require additional weeks of instruction depending upon the progress made by any Rush Medical College student.
- Students must pass all required clerkships and be scheduled for completion of all elective clerkship requirements by December 31 of the current calendar year in order to graduate in the next calendar year.
- All students must successfully complete the Clinical Skills Assessment.
- The OMSP will immediately notify future residency program directors where the student has matched if the student does not fulfill or achieve the graduation requirements. If the inability to graduate is determined prior to the match, the student and the OMSP must immediately notify the National Resident Matching Program (NRMP) that the student is withdrawing from the match. The student must notify all of the programs to which he or she said he or she applied that he or she is withdrawing from the match.

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 nine professors, three associate professors, three assistant professors, three 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

Members of this committee are responsible for recommending students to the Dean for admission 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. An annual report is produced for each course within the medical college curriculum. This annual report recommends changes to the course for consideration of the CCE.

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,

Melanie C. Dreher, Ph.D., RN, FAAN
The John L. and Helen Kellogg
Dean of the College of Nursing

Philosophy

The College of Nursing philosophy expresses the beliefs of the faculty regarding the metaparadigm of nursing and nursing education.

Person

The faculty believes that a person is a unique being who possess 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: 1) produce nurses who are competent practitioners, who demonstrate caring behaviors, who are life-long learners that value scholarship and are leaders in the profession; and 2) produce scholars who contribute to the scientific basis of nursing practice and positively influence the profession and the health care system.

Admission Requirements

All applicants applying to Rush University College of Nursing do so through a centralized application system called NursingCAS. Application materials (essay, references, transcripts, etc.) are submitted directly to NursingCAS. Official GRE and TOEFL scores, if required, will still need to be submitted to the Office of Admissions Services prior to the application deadline. Selected applicants will be invited to submit a supplemental application directly to the College upon review of their completed NursingCAS application. A complete file contains the application, required narrative statements and resume, transcripts from every college attended since high school (even if the course was never applied toward a degree), licenses, test scores if applicable and three letters of recommendation. Registered nurses must submit proof of licensure in at least one state or jurisdiction.

Applicants must submit transcripts of all college work attempted regardless of whether a degree was earned at the previous colleges/ universities, along with recommendations from three individuals who know the applicant well. Two recommendations must come from former teachers and one from the applicant's most recent employer, when applicable. Recommendations from family members or close friends are not permissible. All materials of the application are taken into consideration when evaluating an applicant.

Each applicant to post-licensure graduate study should have earned a baccalaureate degree with a recognized upper-division major. The majority of credit toward the degree should be earned through university level coursework. Previous nursing coursework completed at other schools or at schools not offering an upper-division major in nursing must be validated.

Students taking courses under student-at-large status will not be admitted if their Rush GPA is below 3.0. All materials submitted for evaluation are taken into consideration.

Master of Science in Nursing

Prelicensure Clinical Nurse Leader Generalist Entry Masters (GEM)

Students are considered for admission to the GEM program after completing baccalaureate education at another accredited college or university. Graduates of affiliate institutions that satisfy GPA requirements, meet the objectives of the pre-health curriculum, obtain the approval of the health careers advisor, complete all required documents and interviews and pass review of the Admissions Committee will continue at Rush University to pursue their master's degree in nursing. Transfer credit is not awarded for required coursework in which the student earned less than a "C" grade. Physical education and technical skill courses are not accepted for transfer credit. Courses considered for transfer credit must be at the graduate level.

Program Prerequisites:

- Organic Chemistry or Biochemistry (with lab)
- Human Anatomy
- Human Physiology
- Microbiology
- Normal Nutrition
- Statistics
- Introductory or General Psychology
- Human Growth and Development, Developmental Psychology or Child Psychology

All required prerequisite courses must be completed, with a grade of "C" or better, prior to enrolling at Rush. 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.

Post-licensure Clinical Nurse Leader (CNL)

Applicants to the post-licensure Clinical Nurse Leader (CNL) program must have earned a Baccalaureate degree from an accredited university. Applicants must have a minimum cumulative GPA of 3.0 in all previous university or college coursework and submit transcripts of all college work attempted regardless of whether a degree was earned at the previous colleges/universities. The Graduate Record Examination (GRE) will be waived if the cumulative GPA is 3.25 or

greater OR if the nursing GPA is 3.0 or greater. The applicant must provide proof of licensure in at least one state or jurisdiction, complete an interview with one faculty member and submit recommendations from three persons able to evaluate his or her potential for success in graduate study. Students taking courses under student-at-large status will not be admitted if their Rush GPA is below 3.0. All materials submitted for evaluation are taken into consideration.

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 focus on advanced practice nursing after completing a BSN, an MSN or an associate degree in nursing and a nonnursing Baccalaureate or higher degree from an accredited college or university. Students select an area of specialization in one of the following populations: Adult-Gerontology, Family, Neonatal, Pediatric, Psychiatric-Mental Health and one of the following roles: Nurse Practitioner (NP)*, Clinical Nurse Specialist (CNS)* or Nurse Anesthesia (CRNA).

Specific areas of concentration have RN practice requirements that must be met prior to enrollment in the clinical courses for those DNP and post-master's programs. Rush University Admissions has information on current practice requirements. Nurse anesthesia has specific practice requirements that must be completed prior to admission into the program.

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 have leadership experience and an MSN, or a BSN and an MBA. Students must enter this area of focus with a capstone project idea.

Doctor of Nursing Practice: Enhancing 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 BSN are considered for admission to Advanced Public Health Nursing. Students with an MSN and advanced practice nursing certification are considered for admission in the Enhancing Population Health Outcomes option.

PhD in Nursing Science

In addition to the basic requirements established by The Graduate College, PhD applicants to the Division of Nursing are evaluated using the following criteria:

- A cumulative GPA of a 3.0 on a 4.0 scale for all undergraduate and graduate courses
- A cumulative GPA of a 3.0 on a 4.0 scale for all nursing courses
- A comprehensive essay delineating a research area of interest, qualifications and readiness for doctoral study
- Graduate Record Examination (GRE). For more information go to <http://www.gre.org>.
- Test of English as a Foreign Language (TOEFL) scores for applicants who have not completed four years of high school education in the United States
- Two acceptable interviews with Division of Nursing faculty. These are arranged after a preliminary review of academic credentials and application materials.

Deadlines for Application

Current application deadlines for prelicensure and graduate nursing programs may be obtained at the [College of Nursing Admissions page](#) or by contacting Rush University Admissions. 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. Specific graduate areas of concentration have pooled reviews for all completed applications due to limited enrollments.

International Students

Students from other countries are welcome to apply. Limited financial aid is available. Test of English as a Foreign Language (TOEFL) is required for students who are nonnative speakers of English or who have not completed a minimum of three years of higher education and received their baccalaureate degree in the United States.

Post-Graduate Nondegree Option

A post-graduate non-degree option is available for RNs with a master's degree in nursing. This program has been designed to facilitate the attainment of specific skills without replicating an entire graduate program. Transcripts are evaluated on an individual basis to determine advanced placement. Applicants should contact the Office of Admission Services for specific admission requirements for each area of concentration. Applicants to the nondegree options must

submit transcripts of all college coursework attempted regardless of whether a degree was earned at the previous colleges/universities, along with evidence of RN licensure in at least one state or jurisdiction. All applicants must also complete an interview with at least one faculty member.

Programs

The College of Nursing offers graduate nursing education that allows the student to exit with the Master of Science in Nursing, Doctor of Nursing Practice or the Doctor of Philosophy with a major in Nursing. A set of core courses (or its equivalent) is required for every student. Cognate courses representing coursework from the biological, behavioral and organizational sciences are also required by each degree. Advanced clinical specialty courses are required as determined by an area of advanced practice concentration.

Master of Science in Nursing

Prelicensure Clinical Nurse Leader Generalist Entry Masters (GEM)

The GEM program requires the student to have earned a baccalaureate degree from an 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 NCLEX for RN licensure and Clinical Nurse Leader (CNL) certification upon completion of the program. GEM students are expected to complete the MSN requirements on a full-time basis in six terms.

Post-Licensure Clinical Nurse Leader (CNL)

The program is six terms in length and offered as a part-time program of study. All courses are offered online. 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.

Doctor of Nursing Practice (DNP)

Doctor of Nursing Practice with Clinical Specialty Certification

A minimum of eight credit hours of practicum in the specialty area of concentration for the DNP degree is required. 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. Depending upon the area of specialization, a

minimum of 69 trimester hours of post-baccalaureate credit or 30 hours of Post-master's credit are required for the following advanced practice or advanced public health nursing DNP options.

Nurse Practitioner:

- Adult-Gerontology Acute Care (AGACNP)
- Adult-Gerontology Primary Care (AGPCNP)
- Family (FNP)
- Neonatal (NNP)
- Pediatric (PNP)
- Pediatric Acute Care (PACNP)
- Psychiatric-Mental Health (PMHNP)

Clinical Nurse Specialist:

- Adult-Gerontology Primary Care (AGCNS)
- Adult-Gerontology Critical Care (AGCCNS)
- Neonatal (NCNS)
- Pediatric (PCNS)

Advanced Public Health Nursing (APHN)

Nurse Anesthesia (CRNA)

Doctor of Nursing Practice: Systems Leadership

A post-master's practice doctorate that prepares graduates for systems-level leadership and improving outcomes in a variety of settings.

Doctor of Nursing Practice: Enhancing Population Health Outcomes

The focus of this post-MSN DNP option for advanced practice nurses is on the development of population-based knowledge and skills to enhance clinical health outcomes for patient aggregates, communities and populations.

Doctor of Philosophy in Nursing Science (BSN/MSN-PhD)

The PhD graduate is prepared as clinical nurse researcher with the leadership skills necessary to serve as a senior academician and influence health care systems and policy. An accelerated BSN-PhD program is also offered. *Non-nurses with a graduate degree in a health-related field may apply for admission to the PhD program.*

Terminal Objectives

Master of Science in Nursing

The Clinical Nurse Leader (GEM and CNL) program comprehensively prepares students to be graduate nurse clinicians with a focus in clinical leadership. Graduates are prepared to function at a high level in inpatient, out-patient and community settings.

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 macrosystem concepts.
- Demonstrate professional values in nursing practice.
- Employ therapeutic use of self and intentional presence to protect the value of the human relationship.

Doctor of Nursing Practice

The DNP degree is designed to prepare graduates to function as leaders in advanced nursing practice. 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 through system redesign and evidence-based decision making. These roles require a central focus on clinical practice with skills in education, research and leadership.

- 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.

Doctor of Philosophy

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.

- Generate knowledge to improve health outcomes and inform health policy.
- Integrate knowledge of diversity (i.e., ethnic, cultural, economic, other) into the design, conduct and relevance of research.
- Collaborate with multidisciplinary teams in the design and conduct of research.
- Disseminate translational research findings to diverse communities and health care settings.
- Use relevant emerging technology to advance research, education and health outcomes.
- Conduct research that is ethical and responsible.
- Assume faculty role of scholar and scientist within academic, clinical and general health care environments.

Academic Progression

Student progress in the College of Nursing is reviewed and evaluated in several ways. The academic policies established by the faculty are interpreted and applied by the student's academic advisor, the Associate Dean of Academic Affairs and the 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. Any such student not voluntarily withdrawing will be dismissed from the University. 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.

Graduate Students

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, he or she 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 has a second probationary event.

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," "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.

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

Graduation Requirements

Master of Science in Nursing

Precicensure Clinical Nurse Leader Generalist Entry Master's (GEM) requires a minimum of 74 trimester hours of didactic and 1,240 of clinical instruction. Candidates must pass a comprehensive examination. Graduates are eligible to write the National Council Licensure Examination for Registered Nurses (RN Licensure examination) and sit for CNL certification.

Post-licensure Clinical Nurse Leader (CNL) requires a minimum of 37 credit hours and 400 clinical hours.

Part-time master's students must complete degree requirements within five years.

Doctor of Nursing Practice

The DNP degree requires a minimum of 69 trimester hours of post-baccalaureate or 30 trimester hours of post-master's study. Part-time Doctor of Nursing Practice students must complete degree requirements within five years.

Doctor of Philosophy

Divisional graduation requirements require completion of the approved individual program of study. Coursework for the PhD must

be the equivalent of at least 53 trimester hours of graduate credit in addition to the completed dissertation.

Graduation and Commencement

All students at the end of the term in which they graduate must complete a Degree Approval Form to be approved for graduation. Diplomas will not be distributed until all University requirements have been met.

Commencement is held annually in the spring. Students who have completed requirements in the preceding Fall or Spring may participate in the spring ceremony. Students who will complete degree requirements in the Summer term immediately following the ceremony may also participate in the spring commencement ceremony. The Rush University Division of Student Affairs contacts eligible students about participation in commencement.

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. The Senate members elect their own chairperson annually.

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. The committees include the following:

Admissions and Progressions Committee

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. There are eight members on this committee, including two student representatives.

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. There are five members on the MSN and PhD curriculum committees, including one student representative for each committee; and eight members on the DNP curriculum committee, including two student representatives.

Committee on Cultural Diversity

The Diversity Committee is involved with the recruitment and retention of students and faculty from minority groups and data collection and research in relation to Affirmative Action activities and progress. There are six members on this committee, including two student representatives.

Faculty Appointments and Promotions Committee

This committee acts upon the appointments and promotions of faculty in accordance with the Rules for Governance. There are five members on this committee, representing junior and senior faculty members.

Academic Program Curricula

Master of Science in Nursing (MSN) for Nonnurses and RNs

Generalist Entry Master's (GEM) With a Focus in Clinical Leadership for Nonnurses

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

Master of Science in Nursing (MSN) for Nonnurses and RNs (cont.)

Clinical Nurse Leader (CNL) for RNs

Term 1

NSG-532	Advanced Physiology	3
NSG-602	Health Economics, Policy and Finance	3

Term 2

NSG-533	Advanced Pathophysiology	3
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NSG-525	Health Assessment Across the Lifespan	2
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NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1
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Term 3

NSG-531	Advanced Pharmacology	3
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NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3
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Term 4

NSG-521	Organizational and Systems Leadership	3
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NSG-524	Health Promotion in Individuals and Clinical Populations	3
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Term 5

NSG-523	Research for Evidence-Based Practice	3
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NSG-513	Capstone Seminar: Advanced Generalist	1
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Term 6

NSG-512	Clinical Leadership for Improving Patient Outcomes	3
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NSG-514	Clinical Immersion and Capstone: Advanced Generalist	6
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Program Total 37

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Adult-Gerontology Acute Care (AGACNP)

Graduate Nursing Core			NSG-602	Health Care Economics, Policy and Finance	3
NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	NSG-572	Quality and Safety for the Aging Adult	3
Advanced Practice Nursing Core			NSG-570A	Pharmacotherapeutics—Acute Care	3
NSG-532	Advanced Physiology	3	NSG-571A	Management: Adult/Gerontology I	3
NSG-533	Advanced Pathophysiology	3	NSG-571B	Management: Adult/Gerontology II	3
NSG-531	Advanced Pharmacology	3	NSG-571C	Management: Adult/Gerontology Critical Illness	3
NSG-535	Diagnostics for the APRN	3	DNP and Specialty Practica		
NSG-537	Transition to the APRN Role	3	NSG-606	DNP/Specialty Practicum (420 Clock Hours)	5
DNP Core			NSG-607	DNP/Specialty Immersion Residency (420 Clock Hours)	5
NSG-603	Effective Project Planning, Implementation and Evaluation	3	Program Total 69		
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3			

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Adult-Gerontology Primary Care (AGPCNP)

Graduate Nursing Core			NSG-602	Health Care Economics, Policy and Finance	3
NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	NSG-534	Major Psychopathological Disorders	3
Advanced Practice Nursing Core			NSG-570B	Pharmacotherapeutics-Primary Care	3
NSG-532	Advanced Physiology	3	NSG-571A	Management: Adult/Gerontology I	3
NSG-533	Advanced Pathophysiology	3	NSG-571B	Management: Adult/Gerontology II	3
NSG-531	Advanced Pharmacology	3	NSG-572	Quality and Safety for Aging Adults	3
NSG-535	Diagnostics for the APRN	3	DNP and Specialty Practica		
NSG-537	Transition to the APRN Role	3	NSG-606	DNP/Specialty Practicum (420 Clock Hours)	5
DNP Core			NSG-607	DNP/Specialty Immersion Residency (420 Clock Hours)	5
NSG-603	Effective Project Planning, Implementation and Evaluation	3	Program Total 69		
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3			

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Family (FNP)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-525	Health Assessment Across the Lifespan	2	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1			

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	NSG-534	Major Psychopathological Disorders	3
NSG-533	Advanced Pathophysiology	3	NSG-566	Population Assessment and Health Promotion Frameworks	3
NSG-531	Advanced Pharmacology	3	NSG-567	Population Intervention Planning, Implementation and Evaluation	3
NSG-535	Diagnostics for the APRN	3	NSG-569	Maternal Child Management for the FNP	3
NSG-537	Transition to the APRN Role	3	NSG-570B	Pharmacotherapeutics-Primary Care	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3	NSG-571A	Management: Adult/Gerontology I	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3	NSG-571B	Management: Adult/Gerontology II	3

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum(496 Clock Hours)	6
NSG-607	DNP/Specialty Immersion Residency (336 Clock Hours)	4

Program Total 69

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Neonatal (NNP)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	NSG-549	Neonatal Pharmacotherapeutics	3
NSG-547	Neonatal Pathophysiology	3	NSG-546	Developmental Physiology of the Fetus/ Neonates	3
NSG-531	Advanced Pharmacology	3	NSG-550A	Neonatal Management I	3
NSG-548	Advanced Neonatal Physical Assessment	3	NSG-550B	Neonatal Management II	3
NSG-537	Transition to the APRN Role	3	NSG-550C	Neonatal Management III	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3	NSG-606	DNP/Specialty Practicum (580 Clock Hours)	7
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3	NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
NSG-603	Effective Project Planning, Implementation and Evaluation	3			

Specialty Curriculum Content

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

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum (580 Clock Hours)	7
NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3

Program Total 66

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Pediatric (PNP)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	NSG-556	Applied Pharmacology-Pediatric	3
			IDS-505	Palliative Care	2

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	NSG-551A	Advanced Primary Care of the Child I	3
NSG-533	Advanced Pathophysiology	3	NSG-557A	Pediatric Acute Care I	3
NSG-531	Advanced Pharmacology	3	NSG-557B	Pediatric Acute Care II	3
NSG-535	Diagnostics for the APRN	3	DNP and Specialty Practica		
NSG-537	Transition to the APRN Role	3	NSG-606	DNP/Specialty Practicum (580 Clock Hours)	7
			NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-603	Effective Project Planning, Implementation and Evaluation	3

Program total 68

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Pediatric Acute Care (ACPNP)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	NSG-556	Applied Pharmacology-Pediatric	3
			IDS-505	Palliative Care	2
			NSG-551A	Advanced Primary Care of the Child I	3

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	NSG-557A	Pediatric Acute Care I	3
NSG-533	Advanced Pathophysiology	3	NSG-557B	Pediatric Acute Care II	3
NSG-531	Advanced Pharmacology	3	NSG-679	<i>Academic Scholarship in Nursing (recommended)</i>	2-4
NSG-535	Diagnostics for the APRN	3	DNP and Specialty Practica		
NSG-537	Transition to the APRN Role	3	NSG-606	DNP/Specialty Practicum (588 Clock Hours)	7

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3	NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3	Program total 70-72		
NSG-603	Effective Project Planning, Implementation and Evaluation	3			

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Psychiatric-Mental Health (PMHNP)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	NSG-576	Neuropathophysiology: A Lifespan Approach	3

Advanced Practice Nursing Core

NSG-533	Advanced Pathophysiology	3	NSG-575	Psychopharmacology	3
NSG-531	Advanced Pharmacology	3	NSG-534	Major Psychopathological Disorders	3
NSG-537	Transition to the APRN Role	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

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3	DNP and Specialty Practica		
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3	NSG-606	DNP/Specialty Practicum (580 Clock Hours)	7
NSG-603	Effective Project Planning, Implementation and Evaluation	3	NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3

Program total 66

Doctor of Nursing Practice (DNP) - Nurse Practitioner Options and Nurse Anesthesia (cont.)

Nurse Practitioner—Nurse Anesthesia (CRNA)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	ANA-500	Neurobiology	3

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	NSG-541	Chemistry and Physics in Anesthesia	3
NSG-533	Advanced Pathophysiology	3	NSG-542	Nurse Anesthesia Pharmacology	3
NSG-531	Advanced Pharmacology	3	NSG-543A	Anesthesia Principles I: Basic Principles of Nurse Anesthesia	3
NSG-537	Transition to the APRN Role	3	NSG-543B	Anesthesia Principles II: Advanced Principles of Nurse Anesthesia	3
			NSG-543C	Anesthesia Principles III: Obstetric and Pediatric Anesthesia	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-603	Effective Project Planning, Implementation and Evaluation	3

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum (756 Clock Hours)	9
NSG-607	DNP/Specialty Immersion Residency (2100 Clock Hours)	25

Program total 93

Doctor of Nursing Practice (DNP) - Clinical Nurse Specialist Options and Advanced Public Health Nursing

Clinical Nurse Specialist—Adult-Gerontology Primary Care (AGCNS)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	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

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3
NSG-533	Advanced Pathophysiology	3
NSG-531	Advanced Pharmacology	3
NSG-535	Diagnostics for the APRN	3
NSG-679	Academic Scholarship in Nursing Education	2
		-4
NSG-537	Transition to the APRN Role	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-603	Effective Project Planning, Implementation and Evaluation	3

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum (412 Clock Hours)	5
NSG-607	DNP/Specialty Immersion Residency (420 Clock Hours)	5

Program total 71-73

Doctor of Nursing Practice (DNP) - Clinical Nurse Specialist Options and Advanced Public Health Nursing (cont.)

Clinical Nurse Specialist—Adult-Gerontology Critical Care (AGCCNS)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3
NSG-523	Research for Evidence-Based Practice	3
NSG-524	Health Promotion in Individuals and Clinical Populations	3
NSG-525	Health Assessment Across the Lifespan	2
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3
NSG-533	Advanced Pathophysiology	3
NSG-531	Advanced Pharmacology	3
NSG-535	Diagnostics for the APRN	3
NSG-679	Academic Scholarship in Nursing Education	2
		-4
NSG-537	Transition to the APRN Role	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	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
NSG-605	DNP Capstone (168 Clock Hours)	2

Specialty Curriculum Content

NSG-570A	Pharmacotherapeutics—Acute Care	3
NSG-572	Quality and Safety for Aging Adults	3
NSG-571A	Management: Adult/Gerontology I	3
NSG-571B	Management: Adult/Gerontology II	3
NSG-571C	Management: Adult/Gerontology Critical Illness	3

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3

Program total 71–73

Doctor of Nursing Practice (DNP) - Clinical Nurse Specialist Options and Advanced Public Health Nursing (cont.)

Clinical Nurse Specialist—Neonatal (NCNS)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	NSG-546	Developmental Physiology of the Fetus/Neonate	3

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	NSG-549	Neonatal Pharmacotherapeutics	3
NSG-547	Neonatal Pathophysiology	3	IDS-505	Palliative Care	2
NSG-531	Advanced Pharmacology	3	NSG-550A	Neonatal Management I	3
NSG-536	Principles of Case Management for Advanced Nursing Practice	3	NSG-550B	Neonatal Management II	3
NSG-535	Diagnostics for the APRN	3	NSG-550C	Neonatal Management III	3
NSG-679	Academic Scholarship in Nursing Education	2	NSG-551A	Advanced Primary Care of the Child I	3

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum (664 Clock Hours)	8
NSG-607	DNP/Specialty Immersion Residency (168 Clock Hours)	2

Program total 79–81

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-603	Effective Project Planning, Implementation and Evaluation	3

Doctor of Nursing Practice (DNP) - Clinical Nurse Specialist Options and Advanced Public Health Nursing (cont.)

Clinical Nurse Specialist—Pediatric (PCNS)

Graduate Nursing Core

NSG-521	Organizational and Systems Leadership	3	NSG-604A	DNP Project Planning I	1
NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3	NSG-604B	DNP Project Planning II	1
NSG-523	Research for Evidence-Based Practice	3	NSG-604C	DNP Project Planning III	1
NSG-524	Health Promotion in Individuals and Clinical Populations	3	NSG-605	DNP Capstone (168 Clock Hours)	2
NSG-525	Health Assessment Across the Lifespan	2	Specialty Curriculum Content		
NSG-625L	Health Assessment Across the Lifespan Lab: Specialty	1	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

Advanced Practice Nursing Core

NSG-532	Advanced Physiology	3	DNP and Specialty Practica		
NSG-533	Advanced Pathophysiology	3	NSG-606	DNP/Specialty Practicum (664 Clock Hours)	8
NSG-531	Advanced Pharmacology	3	NSG-607	DNP/Specialty Immersion Residency (168 Clock Hours)	2
NSG-536	Principles of Case Management for Advanced Nursing Practice	3			

NSG-535	Diagnostics for the APRN	3
NSG-679	Academic Scholarship in Nursing Education	2
		-4
NSG-537	Transition to the APRN Role	3

DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-603	Effective Project Planning, Implementation and Evaluation	3

Program total 73-75

Doctor of Nursing Practice (DNP) - Clinical Nurse Specialist Options and Advanced Public Health Nursing (cont.)

Advanced Public Health Nursing (APHN)

Graduate Nursing Core

NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3
NSG-523	Research for Evidence-Based Practice	3
DNP Core		
NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-604A	DNP Project Planning I	1
NSG-604B	DNP Project Planning II	1
NSG-604C	DNP Project Planning III	1
NSG-605	DNP Capstone (168 Clock Hours)	2

Specialty Curriculum Content

NSG-565	Public Health Systems and the APHN Role	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 and Policy, Politics, Power and Ethics	3
NSG-568	Environmental Health	3
NSG-566	Population Assessment and Health Promotion Frameworks	3
NSG-536	Principles of Case Management for Advanced Practice Nursing	3
NSG-567	Population Intervention Planning, Implementation and Evaluation	3
NSG-611	Financial and Business Concepts	3
	Cognate	9

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum (588 Clock Hours)	7
NSG-607	DNP/Specialty Immersion Residency (252 Clock Hours)	3

Program total 63

Doctor of Nursing Practice (DNP) - Leadership Tracks

Systems Leadership

Term 1

NSG-603 Effective Project Planning, Implementation and Evaluation 3

NSG-602 Health Care Economics, Policy and Finance 3

Term 2

NSG-612 Applied Organizational Analysis and Management of Human Resources 3

NSG-613 Data and Decision Making for Strategic Outcomes Management 2

NSG-604A DNP Project Planning I 1

Term 3

NSG-611 Financial and Business Concepts 3

NSG-614 The Leader and Policy, Politics, Power and Ethics 3

NSG-604B DNP Project Planning II 1

Term 4

NSG-607 DNP/Specialty Immersion Residency 3

NSG-601 Leader as Change Catalyst in an Evolving Health Care Environments 3

NSG-604C DNP Project Planning III 1

Term 5

NSG-607 DNP/Specialty Immersion Residency 3

NSG-679 Academic Scholarship in Nursing (optional) 2-4

Term 6

NSG-605 DNP Capstone 3

Program total 34-36

Doctor of Nursing Practice (DNP) - Leadership Tracks (cont.)

Enhancing Population Health Outcomes

Graduate Nursing Core

NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3
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DNP Core

NSG-602	Health Care Economics, Policy and Finance	3
NSG-601	Leader as Change Catalyst in Evolving Health Care Environments	3
NSG-604A	DNP Project Planning I	1
NSG-604B	DNP Project Planning II	1
NSG-604C	DNP Project Planning III	1
NSG-605	DNP Capstone (168 Clock Hours)	2

Specialty Curriculum Content

NSG-565	Public Health Systems and the APHN Role	3
NSG-614	The Leader and Policy, Politics, Power and Ethics	3
NSG-566	Population Assessment and Health Promotion Frameworks	3
NSG-568 <u>or</u> NSG-536	Environmental Health <u>or</u> Principles of Case Management for Advanced Practice Nursing	3
NSG-567	Population Intervention Planning, Implementation and Evaluation	3
NSG-611	Financial and Business Concepts	3

DNP and Specialty Practica

NSG-606	DNP/Specialty Practicum*	6
NSG-607	DNP/Specialty Immersion Residency*	3

Program total 38

If APHN certification is desired, add the following:

NSG-612	Applied Organizational Analysis and the Management of Human Resources	3
NSG-568 <u>or</u> NSG-536**	Environmental Health <u>or</u> Principles of Case Management for Advanced Practice Nursing	3
NSG-606	DNP/Specialty Practicum*	3

Total credits for certification 47

*includes faculty-led clinical supervision hours

**whichever course was not completed as part of the Specialty Curriculum Content must be taken since both are required for APHN certification

**Doctor of Philosophy (PhD) - Nursing Science
(formally offered through The Graduate College)**

Theory Courses

NSG-680	Understanding Scientific Paradigms	3
NSG-681	Understanding Theoretical Framework Development	3

Statistics Courses

NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3
NSG-684	Intermediate Statistics	3
NSG-685	Multivariate Statistics	3

Research Courses

NSG-686	The Research Process: Quantitative Design and Methods Part I	3
NSG-687	The Research Process: Quantitative Design and Methods Part II	3
NSG-688	The Research Process: Qualitative Design and Methods	3
NSG-691	Advanced Clinical Research Practicum (ACRP)	12

Ethics Courses

NSG-683	Ethical Conduct in Research Settings	3
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Role Courses

NSG-682	Developing Professional Writing Skills	3
NSG-689	Leadership Seminar	3
NSG-690	Grantsmanship	3
NSG-679	Academic Scholarship in Nursing	3

Cognate

8

Dissertation

NSG-699	Dissertation	20
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Independent Study

NSG-900	Independent Study	Var
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Post-Graduate Non-Degree Certificates

The Post-Graduate Non-Degree Certificate is intended for certified Advanced Practice Registered Nurses seeking a second certification. The following courses or their equivalent need to be 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.

Post-Graduate Advanced Practice Certificate Options:		Specialty Curriculum Content	
• Adult-Gerontology Primary Care		Applied Pharmacology	3
• Neonatal		Specialty Cognate	3
• Pediatric Acute Care		Management I	3
• Pediatric Primary Care		Management II	3
		Management III	3
		DNP and Specialty Practica	
		Specialty Practicum (336 clock hours)	4
		Specialty Immersion Residency (168 clock hours)	2
		Program total 21	

For more information about our graduation rates, the median debt of students who completed the program and other important information, please visit our website at <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 in industry. 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.

David C. Shelledy, PhD, RRT, FAARC
Dean, 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 Clinical Sciences (Physician Assistant Studies and Perfusion Technology); Clinical Nutrition; Communication Disorders and Sciences (Audiology and Speech-Language Pathology); Health Systems Management; Medical Laboratory Science; Medical Physics; Occupational Therapy; Religion, Health and Human Values; Respiratory Care; and Imaging Sciences (Imaging Sciences and Vascular Ultrasound). 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); clinical pastoral education (certificate); health systems management (MS); imaging sciences (BS); medical physics (residency); occupational therapy (MS); perfusion technology (BS, MS); physician assistant studies (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, comprised 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 (CHS) 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 CHS programs. For information on how to gain admission to a specific CHS program, please consult the Web pages for the department in which you have an interest.

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 Web pages for the program and department in which you have an interest.

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 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 web site (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 CHS 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 sixteen (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

As a student at Rush University, you 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, 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 (the Team), the Director of Academic and Student Affairs (the Director) in the College of Health Sciences will be notified regarding the granted accommodation. The Director 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 Director 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 Director 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 Director if he or she feels that the approved accommodations are not being implemented as recommended.

The Director 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 Director at a time that is mutually agreeable for the purpose of completing this evaluation. The Director 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 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 (see: <http://www.rushu.rush.edu/registrar/forms.html>). 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 (CHS) faculty. This form is available at: <http://www.rushu.rush.edu/registrar/forms.html>. (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 they will be withdrawn from their 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 comprised 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 Laboratory Management
- Clinical Nutrition
- Communication Disorders and Sciences
- PhD in Health Sciences
- Health Systems Management
- Imaging Sciences Education Program
- Medical Laboratory Science and Specialist in Blood Bank
- Medical Physics
- Occupational Therapy
- Perfusion Technology
- Physician Assistant Studies Program
- Research Administration
- Respiratory Care
- Vascular Ultrasound and Technology

Clinical Laboratory Management: Curriculum

The online Master of Science degree program in Clinical Laboratory Management is designed for the practicing Medical Laboratory Scientist who desires formal, but flexibly delivered graduate education in management. In an effort to meet the need for advanced management skills for laboratory professionals, the program in clinical laboratory management joins the Certificate in Blood Bank program and offers both the SBB certification and the Master of Science degree in Clinical Laboratory Management. The program builds upon the technical knowledge of both programs by providing advanced courses in organizational theory, research, finance, economics and health care organization, as well as clinical laboratory science.

Minimum Admissions Requirements

A baccalaureate degree from a regionally accredited 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) or CLS (NCA) Certification
- Three reference letters

A phone interview will be required.

Clinical Laboratory Management Curriculum

Courses

HSM-502	Health Care Organizations <i>Or</i>	2
CHS-510	Health Care in America <i>Or</i>	2
SBB -583	Blood Bank and Transfusion Service Operation	3
CLM-593	Scientific and Technical Writing*	4
HSM-514	Statistics for Health Care Management <i>Or</i>	4
CLM-591	Evidence-Based Research and Applied Statistics*	4
CLM-594	Health Care Finance*	4
MLS-556	Clinical Laboratory Management <i>Or</i>	3
CLM-590	Principles of Laboratory Management*	3
HSM-515	Human Resource Management <i>Or</i>	4
CLM-597	Issues and Practices	4
	Human Resource Management*	
HSM-572	Health Care Operations Management <i>Or</i>	4
CLM-595	Method Comparison and Process Validation*	4

CLM-598	Health Care Informatics* <i>Or</i>	3
MLS -550	Laboratory Information and Automation Systems	2
HHV-504	Health Care Ethics <i>Or</i>	2
CLM-592	Ethics*	2
MLS -558	Marketing and Negotiations <i>Or</i>	4
SBB -582	Blood Procurement and Blood Product Manufacturing	3
MLS-559	Issues in Pathology <i>Or</i>	4
SBB -580	Human Blood Group	4
MLS -552	Systems Regulatory and Professional Issues <i>Or</i>	2
CLM-596	Quality Systems and Regulatory Issues*	4
CHS-502	Research Methods	3
CLM-599-A	Masters Project I (MGMT)*	2
CLM-599-B	Masters Project II (MGMT)*	2
CLM-599-C	Masters Project III (MGMT)*	2
	Electives	12-16
	Total Hours	63

* Denotes online course

Curriculum subject to change.

Note: Minimum Hours taken at Rush for the MS Degree must equal at least 45 Quarter Hours

Clinical Nutrition: Philosophy

The primary mission of the Department of Clinical Nutrition is to educate nutrition experts, leaders and advocates. Students are prepared to integrate empirically based nutrition knowledge in practice, provide medical nutrition therapy to individuals and groups in a variety of settings, advocate for nutrition-related issues, contribute to the dietetics body of knowledge through research and serve as leaders within the profession.

The philosophy of the department parallels that of the Medical Center in that the academic component is fully integrated with the health care function of the institution. The faculty is committed to excellence in teaching, research and clinical care and strives to be visionary in meeting the future needs of the profession in a changing health care environment.

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 an 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 x4727
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_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. A program acceptance confirmation fee of \$150 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.rush.edu/apply/secure/adm_login.asp. 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 \$150 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 or 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).

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.

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, 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

Fall Quarter

NTR-521	Regulation of Macronutrient Metabolism in Human Nutrition	4
NTR-545	Nutrition Assessment	2
NTR-598	Thesis	3
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-511	Supervised Experience in Food System Management	5
NTR-513	Supervised Experience in Clinical Nutrition I	2

Spring Quarter

NTR-523	Advances in Vitamin and Mineral Nutrition in Human Nutrition	2
NTR-542	Integrating Nutrition in Disease Prevention and Treatment II	4
NTR-598	Thesis	1
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-555	Population Studies in Nutrition Epidemiology	2
NTR-598	Thesis	1
CHS-501	Introduction to Biostatistics for the Health Scientist	3
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	2
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

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-523	Advances in Vitamin and Mineral Nutriture in Human Nutrition	2
NTR-542	Integrating Nutrition in Disease Prevention and Treatment II	4
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-555	Population Studies in Nutrition Epidemiology	2
CHS-501	Introduction to Biostatistics for the Health Scientist	3
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. 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. Department faculty is supplemented by the expertise of physicians, scientists and other health care professionals within the Medical Center. 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 multidisciplinary 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 will provide outstanding graduate education in audiology and speech-language pathology, superior patient care, excellence in research and scholarship, and commitment to service to diverse communities.

Vision Statement

The Department of Communication Disorders and Sciences will be recognized as the clinical center and graduate education program of choice in the state of Illinois and among the very 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 Type 73 School Services Personnel certificate (when 150 hours of supervised experiences are obtained in a school setting)

Communication Disorders and Sciences: Admission Requirements

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, at least one course in the physical sciences and mathematics. 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 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.

Academic Progression

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 Progression

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 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 their program must fulfill the following requirements:

Meet with their 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 CDS 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.

Communication Disorders and Sciences: Speech-Language Pathology Curriculum

Thesis Track

Thesis students may de-select up to 8 credit hours of select coursework 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			Year 2		
Fall Quarter			Fall Quarter		
CDS-504	Speech Production and Speech Perception	4	CDS-514	Speech-Language Pathology Practicum IV	4
CDS-505	Clinical Methods in Speech-Language Pathology I	2	CDS-522	Language Disorders in School-age Children	4
CDS-507	Neurological Bases of Speech, Hearing and Language	4	CDS-568	Cognition and Communicative Disorders	4
CDS-537	Anatomy and Physiology of the Speech System	2	CDS-591	Applied Topics in Communication Sciences and Disorders	1
CDS-526	Articulation and Phonological Disorders	4	IDS-510	Health Care in America	2
CDS-591	Applied Topics in Communication Disorders and Sciences	1	CDS-598	Thesis	2
Winter Quarter			Winter Quarter		
CDS-501	Audiologic Methods for Speech-Language Pathologists	1	CDS-510	Professional Issues in Speech-Language Pathology	2
CDS-506	Clinical Methods in Speech-Language Pathology II	2	CDS-524	Fluency, Dysfluency and Stuttering	2
CDS-511	Speech-Language Pathology Practicum I	2-3	CDS-575	Issues in Counseling	2
CDS-558	Dysphagia	4	CDS-589	Advanced Practicum I	6-9
CDS-564	Aphasia	4	CDS-598	Thesis	2
CDS-581	Research Methods in Communication Disorders	4	IDS-515	Geriatric Interdisciplinary Team Training	Variable
Spring Quarter			Spring Quarter		
CDS-512	Speech-Language Pathology Practicum II	2-3	CDS-590	Advanced Practicum II	12-15
CDS-521	Language Disorders in Preschool Children	4	CDS-598	Thesis	2
CDS-540	Speech Pathology Management of the Head and Neck Cancer Patient	2	Hours Required for MS Degree:		
CDS-563	Voice Disorders	4			
CDS-567	Dysarthria	4			
Summer Quarter					
CDS-513	Speech-Language Pathology Practicum III	4			
CDS-528	Current Issues in AAC Service Delivery	1			
CDS-634	Pediatric Rehabilitative Audiology	2			
CDS-542	Speech Pathology Management of Tracheostomized and Ventilator Dependent Patients	2			
CDS-562	Craniofacial Anomalies	2			
CHS-531	Introduction to Human Disease	2			
CDS-900	Independent Study	2			

Speech-Language Pathology Curriculum: Non-Thesis Track

Year 1

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	Articulation and Phonological Disorders	4
CDS-591	Applied Topics in Communication Disorders and Sciences	1

Winter Quarter

CDS-501	Audiologic Methods for Speech-Language Pathologists	1
CDS-506	Clinical Methods in Speech-Language Pathology II	2
CDS-511	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-512	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-513	Speech-Language Pathology Practicum III	4
CDS-528	Current Issues in AAC Service Delivery	1
CDS-634	Pediatric Rehabilitative Audiology	2
CDS-542	Speech Pathology Management of Tracheostomized and Ventilator Dependent Patients	2
CDS-562	Craniofacial Anomalies	2
CDS-531	Introduction to Human Disease	2

Year 2

Fall Quarter

CDS-514	Speech-Language Pathology Practicum IV	4
CDS-522	Language Disorders in School-age Children	4
CDS-568	Cognition and Communicative Disorders	4
CDS-591	Applied Topics in Communication Sciences and Disorders	1
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-589	Advanced Practicum I	6-9
IDS-515	Geriatric Interdisciplinary Team Training	Variable

Spring Quarter

CDS-590	Advanced Practicum II	12-15
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Hours Required for MS Degree:

108

Communication Disorders and Sciences: Audiology Curriculum

Audiology students who began their studies prior to fall 2012 will follow the Track A or Track B curricula. The program of study alternates between these two tracks.

Audiology students who begin their studies on or after fall 2012 will follow the Track I or Track II curricula. The program of study alternates between these two tracks.

Track A Curriculum

Year 1

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	1
CDS-631	Amplification I	3

Spring Quarter

CDS-605	Embryology and Genetics of the Auditory System	3
CDS-616	Audiology Practicum I	1
CDS-643	Electrophysiologic Assessment of the Auditory System	4
CDS-646	Vestibular Assessment and Rehabilitation	4
CDS-646L	Vestibular Assessment and Rehabilitation Laboratory	1
HHV-504	Interdisciplinary Ethics	2

Summer Quarter

CDS-617	Audiology Practicum II	3
CDS-627	Pathophysiology of the Auditory System	3
CDS-638	Auditory Processing	2
CDS-610	Professional Issues	3

Year 2

Fall Quarter

CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-608	Pharmacology	3
CDS-618	Audiology Practicum III	3
CDS-648	Advanced Electrophysiologic Assessment	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-644	Pediatric Audiology	4

Spring Quarter

CDS-632	Amplification II	5
CDS-636	Educational Audiology	3
IDS-510	Health Care in America	2
CDS-816	Internship I	4

Summer Quarter

CDS-676	Vestibular II	2
CDS-634	Pediatric Rehabilitative Audiology	2
CDS-635	Cochlear Implants	2
CDS-817	Internship II	4

Year 3

Fall Quarter

CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-612	Practice Management	2
CDS-626	Hearing Conservation	3
CDS-660	Leadership Seminar	1
CDS-661	Amplification Seminar	1
CDS-818	Internship III	4

Winter Quarter

CDS-681	Investigative Project	3
CDS-819	Internship IV	5

Spring Quarter

CDS-681	Investigative Project	3
CDS-820	Internship V	5

Summer Quarter

CDS-891	Externship I	8
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Year 4

Fall Quarter

CDS-892	Externship II	8
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Winter Quarter

CDS-893	Externship III	8
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Spring Quarter

CDS-894	Externship IV	8
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Hours Required for AuD Degree: 166

Track B Curriculum

Year 1

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	1
CDS-631	Amplification I	3

Spring Quarter

CDS-605	Embryology and Genetics of the Auditory System	3
CDS-616	Audiology Practicum I	1
CDS-643	Electrophysiologic Assessment of the Auditory System	4
CDS-646	Vestibular Assessment and Rehabilitation	4
CDS-646L	Vestibular Assessment and Rehabilitation Laboratory	1
IDS-510	HealthCare in America	2

Summer Quarter

CDS-610	Professional Issues in Audiology	3
CDS-617	Audiology Practicum II	3
CDS-627	Pathophysiology of the Auditory System	3
CDS-638	Auditory Processing	2

Year 2

Fall Quarter

CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-608	Pharmacology	3
CDS-618	Audiology Practicum III	3
CDS-626	Hearing Conservation	3
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-644	Pediatric Audiology	4

Spring Quarter

CDS-632	Amplification II	5
CDS-636	Educational Audiology	3
HHV-504	Interdisciplinary Ethics	2
CDS-816	Internship I	4

Summer Quarter

CDS-634	Pediatric Rehabilitative Audiology	2
CDS-635	Cochlear Implants	2
CDS-676	Vestibular II	2
CDS-817	Internship II	4

Year 3

Fall Quarter

CDS-591	Applied Topics in Communication Disorders and Sciences	1
CDS-612	Practice Management	2
CDS-648	Advanced Electrophysiology Assessment	4
CDS-660	Leadership Seminar	1
CDS-661	Amplification Seminar	1
CDS-818	Internship III	4

Winter Quarter

CDS-681	Investigative Project	3
CDS-819	Internship IV	5

Spring Quarter

CDS-681	Investigative Project	3
CDS-820	Internship V	5

Summer Quarter

CDS-891	Externship I	8
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Year 4

Fall Quarter

CDS-892	Externship II	8
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Winter Quarter

CDS-893	Externship III	8
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Spring Quarter

CDS-894	Externship IV	8
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Hours Required for AuD Degree: 166

Track I Curriculum

Year 1

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	Interdisciplinary Ethics	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

Spring Quarter

CDS-632	Adult Amplification	5
CDS-636	Educational Audiology	3
CDS-676	Vestibular II	2
CDS-816	Internship I	4
IDS-510	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
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Year 4

Fall Quarter

CDS-892	Externship II	8
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Winter Quarter

CDS-893	Externship III	8
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Spring Quarter

CDS-894	Externship IV	8
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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.

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 are 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. 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 collaborative 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 Web site. 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. Students exploring the thesis option must have a minimum GPA of 3.4 at the end of their first term of enrollment. 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 two options: 1) Evidence-based Practice Systematic Review or 2) Experimental 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 provides leadership, editorial and committee service to state and national scientific and professional associations.

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. Provide core competencies in the areas of research, education and leadership.
6. 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. 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 Education Credentials 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.
- Documentation of specialty certification and licensure.
- 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 Masters 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 Bachelors 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.

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, 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 institution 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 their work and career development.
18. Identify appropriate funding agencies and opportunities.
19. Develop and submit proposals to obtain grant funding.

HSC-610: Research Design I 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 map to Research outcomes 15, 16, 18, and 19.

HSC-615: Research Seminar I 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-base 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

HSC-601	Education Theories and Methods	h3
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 Ethics in Clinical and Research Settings	3
HSC-622	Settings	1
HSC-623	Management and Supervision	3

Professional Tracks*

See Professional Sections for Listings	16
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Elective Courses**

Electives	19
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Independent Study (variable credit)***

Independent Study	variable
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Dissertation****

HSC-617	Dissertation Research	12
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MS Graduate Transfer Credit

Graduate Course credit Transfer	30-45
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* Variable: Minimum 16QH

** Elective courses may be taken at
Rush or other appropriate institutions

*** Variable credit with Advisor approval

**** Variable: Minimum 12QH

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, 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 10 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 HSM 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 either on 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 2012)			HSM Part-Time Program of Study (Students Entering Fall 2012)		
Year 1			Year 1		
Fall Quarter			Fall Quarter		
HSM-502	Health Care Organization	2	HSM-502	Health Care Organization	2
HSM-504A	Professional Seminar I	2	HSM-504A	Professional Seminar I	2
HSM-505	Introduction to Clinical Concepts and Patient Care	2	HSM-531	Health Care Financial Accounting	4
HSM-515	Human Resource Management	4	Winter Quarter		
HSM-531	Health Care Financial Accounting	4	HSM-504B	Professional Seminar II	2
HSM-550A	HSM Internship	1	HSM-33	Health Care Economics	4
Winter Quarter			HSM-552	Health Care Information Systems	2
HSM-504B	Professional Seminar II	2	Spring Quarter		
HSM-557	Quality in Health Care	3	HSM-551	Health Informatics	2
HSM-536	Corporate Finance	4	HSM-514	Statistics for Health Care Management	4
HSM-533	Health Care Economics	4	HHV-504	Health Care Ethics	2
HSM-552	Health Care Information Systems	2	Year 2		
HSM-550B	HSM Internship	1	Fall Quarter		
Spring Quarter			HSM-505	Introduction to Clinical Concepts and Patient Care	2
HSM-551	Health Informatics	2	HSM-523	Managerial Epidemiology	3
HSM-514	Statistics for Health Care Management	4	HSM-515	Human Resources Management	4
HSM-567	Health Insurance and Managed Care	3	Winter Quarter		
HSM-572	Health Care Operations Management	4	HSM-514	Quality in Health Care	3
HHV-504	Health Care Ethics	2	HSM-536	Corporate Finance	4
HSM-550C	HSM Internship	1	HSM-549A	HSM PT Internship	1
Year 2			Spring Quarter		
Fall Quarter			HSM-567	Health Insurance and Managed Care	3
HSM-523	Managerial Epidemiology	3	HSM-572	Health Care Operations Management	4
HSM-559	Health Care Planning and Marketing	4	HSM-549B	HSM PT Internship	1
HSM-532	Health Care Managerial Finance	3	Year 3		
HSM-597A	Master's Project I	4	Fall Quarter		
Winter Quarter			HSM-559	Health Care Planning and Marketing	4
HSM-543	Health Law	3	HSM-532	Health Care Managerial Finance	3
HSM-545	Organizational Analysis and Change	4	HSM-549C	HSM PT Internship	1
HSM-590	Topics in Health Systems Management (elective)	2	Winter Quarter		
HSM-597B	Master's Project II	4	HSM-543	Health Law	3
Spring Quarter			HSM-545	Organizational Analysis and Change	4
HSM-560	Health Policy	3	HSM-590	Topics in Health Systems Management (elective)	0-2
HSM-590	Topics in Health Systems Management (elective)	2	Spring Quarter		
HSM-593	Governance, Interprofessionalism and Leadership	4	HSM-560	Health Policy	3
HSM-596	HSM Capstone: Strategic Management of Health Care Organizations	4	HSM-590	Topics in Health Systems Management (elective)	0-2
			HSM-593	Governance, Interprofessionalism and Leadership	4

Hours Required for MS Degree: 87

Year 4			HSM-545	Organizational Analysis and Change	4
Fall Quarter			HSM-590	Topics in Health Systems Management (elective)	2
HSM-597A	Master's Project I	4			
Winter Quarter			HSM-597B	Master's Project II	4
HSM-590	Topics in Health Systems Management (elective)	0-2	Spring Quarter		
HSM-597B	Master's Project II	4	HSM-560	Health Policy	3
Spring Quarter			HSM-590	Topics in Health Systems Management (elective)	2
HSM-590	Topics in Health Systems Management (elective)	0-2	HSM-593	Governance, Interprofessionalism and Leadership	4
HSM-596	HSM Capstone: Strategic Management of Health Care Organizations	4	HSM-596	HSM Capstone: Strategic Management of Health Care Organizations	4
Hours Required for MS Degree: 87			Hours Required for MS Degree: 87		
HSM Full-Time Program of Study (Students Entering Fall 2011)			HSM Part-Time Program of Study (Students Entering Fall 2011)		
Year 1			Year 1		
Fall Quarter			Fall Quarter		
HSM-502	Health Care Organization	2	HSM-502	Health Care Organization	2
HSM-504A	Professional Seminar I	2	HSM-504A	Professional Seminar I	2
HSM-505	Introduction to Clinical Concepts and Patient Care	2	HSM-531	Health Care Financial Accounting	4
HSM-514	Statistics for Health Care Management	4	Winter Quarter		
HSM-531	Health Care Financial Accounting	4	HSM-504B	Professional Seminar II	2
HSM-550A	HSM Internship	1	HSM-536	Corporate Finance	4
Winter Quarter			HSM-552	Health Care Information Systems	2
HSM-504B	Professional Seminar II	2	Spring Quarter		
HSM-523	Managerial Epidemiology	3	HSM-551	Health Informatics	2
HSM-536	Corporate Finance	4	HSM-557	Quality in Health Care	3
HSM-533	Health Care Economics	4	HSM-576	Ethics for Health Care Managers	2
HSM-551	Health Care Information Systems	2			
HSM-550B	HSM Internship	1	Year 2		
Spring Quarter			Fall Quarter		
HSM-552	Health Informatics	2	HSM-505	Introduction to Clinical Concepts and Patient Care	2
HSM-557	Quality in Health Care	3	HSM-559	Health Care Planning and Marketing	4
HSM-567	Health Insurance and Managed Care	3	HSM-550A	HSM Internship	1
HSM-572	Health Care Operations Management	4	Winter Quarter		
HSM-576	Ethics for Health Care Managers	2	HSM-543	Health Law	3
HSM-550C	HSM Internship	1	HSM-533	Health Care Economics	4
Year 2			HSM-550B	HSM Internship	1
Fall Quarter			Spring Quarter		
HSM-515	Human Resources Management	4	HSM-514	Statistics for Health Care Management	4
HSM-559	Health Care Planning and Marketing	4	HSM-572	Health Care Operations Management	4
HSM-532	Health Care Managerial Finance	3	HSM-550C	HSM Internship	1
HSM-597A	Master's Project I	4	Year 3		
Winter Quarter			Fall Quarter		
HSM-543	Health Law	3	HSM-515	Human Resource Management	4
			HSM-523	Managerial Epidemiology	3

Winter Quarter

HSM-532	Health Care Managerial Finance	3
HSM-545	Organizational Analysis and Change	4

Spring Quarter

HSM-514	Health Insurance and Managed Care	3
HSM-593	Governance, Interprofessionalism and Leadership	4

Year 4

Fall Quarter

HSM-597A	Master's Project I	4
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Winter Quarter

HSM-590	Topics in Health Systems Management (elective)	0-2
HSM-597B	Master's Project II	4

Spring Quarter

HSM-560	Health Policy	3
HSM-590	Topics in Health Systems Management (elective)	0-2
HSM-596	HSM Capstone: Strategic Management of Health Care Organizations	4

Hours Required for MS Degree: **87**

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, Supply Chain, Medical Affairs, 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 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 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 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) or Magnetic Resonance Imaging (MRI).

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) 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 98 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 800 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 or Magnetic Resonance Imaging 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 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

Science Education Courses	Semester Credit Hours	Quarter Credit 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 their cumulative GPA falls below a 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 College 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	2
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	2

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:		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—CT Track

Year I

Fall Quarter

IS-312*	Pathophysiology	5
IS-334	Computed Tomography Positioning and Protocols	3
IS-441	CT Physics	2
IS-451	Sectional Anatomy and Pathology I	6

Course runs September to November. All other courses in this term run August to December.

Winter Quarter

IS-311 ^{and}	Patient Assessment	5
IS-335	Advanced Radiation Biology	3
IS-461	Sectional Anatomy and Pathology II	6

Course runs January to March. All other courses in this term run January to May.

Spring Quarter

IDS-510	Health Care in America	2
IS-322	Pathophysiology II	5

Courses in this term run March to June.

Summer Quarter

IS-442 [%]	Radiologic Contrast Agents	2
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3

Course runs May to August. All other courses in this term run June to August.

Year 2

Fall Quarter

CHS-503	Research and Statistical Methods	5
IS-452 [#]	Health Care Ethics and Critical Thinking	5

IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3

Course runs August to December. All other courses in this term run September to November.

Winter Quarter

IS-332/SAHP-431 ^l	Management II	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3

Course runs January to May. All other courses in this term run January to March.

Spring Quarter

IS-324	Pharmacology	4
IS-471P	Clinical Practicum IV	5

Summer Quarter

IS-490	Cultural Competence and Communication	3
RC-401	Education	5

Total: 93

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	2
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:		97

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

Fall Quarter

IS-312*	Pathophysiology	5
IS-336	Introduction to MRI	3
IS-443	MRI Positioning and Protocols I	3
IS-451	Sectional Anatomy and Pathology I	6

* Course runs September to November. All other courses in this term run August to December.

Winter Quarter

IS-311 ^{and}	Patient Assessment	5
IS-450	MRI Physics	3
IS-461	Sectional Anatomy and Pathology II	6
IS-473	MRI Positioning and Protocols II	3

^{and} Course runs January to March. All other courses in this term run January to May.

Spring Quarter

IDS-510	Health Care in America	2
IS-322	Pathophysiology II	5

Courses in this term run March to June.

Summer Quarter

IS-442%	Radiologic Contrast Agents	2
IS-445P	Clinical Practicum I	5
IS-446	Clinical Seminar I	3

% Course runs May to August. All other courses in this term run June to August.

Year 2

Fall Quarter

CHS-503	Research and Statistical Methods	5
IS-452 [#]	Health Care Ethics and Critical Thinking	5
IS-455P	Clinical Practicum II	5
IS-456	Clinical Seminar II	3

[#] Course runs August to December. All other courses in this term run September to November.

Winter Quarter

IS-332/SAHP-431 [†]	Management II	3
IS-465P	Clinical Practicum III	5
IS-466	Clinical Seminar III	3

[†] Course runs January to May. All other courses in this term run January to March.

Spring Quarter

IS-324	Pharmacology	4
IS-471P	Clinical Practicum IV	5

Summer Quarter

IS-490	Cultural Competence and Communication	3
RC-401	Education	5
Total:		97

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. Advanced Life Support (ACLS)
5. Successfully complete 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 clinical laboratory scientists/medical technologists requires frequent adaptation to new laboratory methodologies and instrumentation. Clinical medicine requires today's medical laboratory scientist/medical technologist 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/medical technologist 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/medical technologist 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/medical technologist 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 Master of Science, major in Medical Laboratory Science. 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/medical laboratory technicians. Certified CLTs/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 CLT/MLT certification.

Bachelor of Science Program

It is the aim of the baccalaureate program to educate medical laboratory scientists to effectively meet the changing needs of laboratory medicine.

Educational Goals

- Graduate competent practitioners who possess the skills and knowledge to function at an optimal level in various clinical 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 the following areas:

- Know and understand procedures for proper specimen collection and processing of biological specimens
- Know and practice all safety regulations for the proper handling of chemical and biological specimens
- Be able to perform, with a high level of competence, analytical tests on body fluids, cells and blood products
- Establish procedures for, evaluate and perform preventive and corrective maintenance on equipment and instruments
- Integrate and relate data generated by various clinical laboratory departments while making judgments regarding possible discrepancies and adherence to quality control protocols
- Evaluate the adequacy with which decisions are made from clinical data
- Evaluate new techniques and incorporate new procedures into daily laboratory operation
- Demonstrate professional conduct and interpersonal skills with patients, fellow employees, other health care providers and the public

The Medical Laboratory Sciences professional program consists of two parts: didactic (classroom learning) and clinical (practice in the clinical laboratory). After the completion of the program, graduates usually take national certification/registration examinations.

All students entering one of the 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/registration and licensure requirements for entry into the profession may depend on documentation of such things as drug screening, a background check for a history of criminal offenses and psychiatric screening. A drug screen is required before entering the clinical rotation. 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 the:

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.naaMLS.org>

The Specialist in Blood Bank certificate program is accredited by the:

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

2. Official transcripts from each college or university attended
3. Affiliated students must successfully complete all pre-admission coursework and be recommended by the affiliate's Health Career Advisor
4. An overall GPA of 2.5 on a 4.0 scale
5. Personal interview
6. Three letters of recommendation
7. 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.

Medical Laboratory Science: Admission Requirements for Bachelor of Science Applicants

Applicants must complete the preprofessional requirements. 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 an hour. 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 may 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 Education Credentials 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 (including organic and quantitative analysis); 18 quarter/12 semester hours of biology (including microbiology); and 4 quarter/3 semester hours of mathematics (algebra and statistics)

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 Hours of Required and Elective Courses	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. Students who fail 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.

Documentation of Tuberculosis Testing

All students must provide the results from tuberculosis tests in order to begin the program. Students should thereafter be tested annually for tuberculosis and should submit the results to the Program Director or his or her designate. Failure to comply can lead to dismissal from the program.

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. 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 an hour. 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 may 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 (including organic and quantitative analysis); 18 quarter/12 semester hours of biology (including microbiology); and 4 quarter/3 semester hours of mathematics (algebra and statistics).
- Affiliated students must successfully complete all pre-admission coursework and be recommended by the affiliate's Health Career Advisor.
- 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. Students who fail 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.

Documentation of Tuberculosis Testing

All students must provide the results from tuberculosis tests in order to begin the program. Students should thereafter be tested annually for tuberculosis and should submit the results to the Program Director or his or her designate. Failure to comply can lead to dismissal from the program.

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: Bachelor of Science Curriculum

Preprofessional Program

The preprofessional 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. The following courses are required before a student comes to the Rush campus:

- 24 quarter hours (16 semester hours) of chemistry (organic, quantitative analysis and biochemistry recommended)
- 18 quarter hours (12 semester hours) of biology (anatomy and physiology, microbiology and genetics recommended)
- 4 quarter hours (3 semester hours) of mathematics (algebra and statistics recommended)
- In some cases courses taken at a college or university outside of the United States may be considered to meet some prerequisite requirements but they must be evaluated and considered equivalent to U.S. courses by the Education Credentials Evaluation (ECE).

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.

	Requirements2	Semester Credit Hours	Quarter Credit Hours
2	Courses in Communica- tions (English, composition)	6	9
1	Course in the Mathematics (college algebra or higher)	3	4
2	Courses in the Life Sci- ences (biology, microbiol- ogy, anatomy and physi- ology)	6	9
1	Course in the Physical Sciences (physics or chemistry)	3	4
1	Course in the Social Sci- ences (sociology, psychol- ogy, history, government, political science)	3	4
1	Course in the Humanities, Fine Arts, Philosophy or Ethics (may not include a performance class)	3	4
12	Elective courses in Com- munications, Humanities, Fine Arts, Philosophy, Ethics, Social Sciences, Life Sciences, Physical Sci- ences or Computer Sci- ence to total 60 semester credit hours for the core general education require- ments for the College	36	54
	TOTAL	60	90

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. Students apply basic concepts as they rotate through the laboratories of Rush University Medical Center and affiliated hospitals. Currently, affiliate hospitals include the University of

Chicago, Northwestern Memorial, Ann and Robert H. Lurie Children's Hospital and the University of Illinois at Chicago. Additionally, students are prepared for supervisory and teaching positions through courses in management and education.

Year 1

Fall Quarter

MLS-300	Laboratory Fundamentals	2
MLS-301	Clinical Chemistry I	4
MLS-310	Hematology I	5
MLS-321	Clinical Immunology	4
MLS-344	Professional Development I	1

Winter Quarter

MLS-302	Clinical Chemistry II	3
MLS-312	Body Fluid Analysis	4
MLS-330	Microbiology	5
MLS-345	Professional Development II	1

Spring Quarter

MLS-303	Clinical Chemistry III	3
MLS-311	Hematology II	2
MLS-320	Immunohematology,	5
MLS-331	Parasitology, Mycology and Virology	4
MLS-440	MLS Seminar	2
HHV-504	Ethics in Health Care	2

Summer Quarter

MLS-433	Molecular Techniques	4
MLS-450	LIS and LAS	2
	Clinical Practica*	8

Year 2

Fall Quarter

MLS-422	Clinical Immunology II	2
MLS-456	Clinical Laboratory Management	2
IDS-510	Health Care America	2
	Clinical Practica*	8

Winter Quarter

MLS-413	Hematology Case Studies	2
MLS-451	Quality Issues in Clinical Laboratory Sciences	2

MLS-452	Regulatory Issues	2
CHS-501	Introduction to Biostatistics	3
	Clinical Practica*	8

Spring Quarter

MLS-432	Infectious Disease Case Studies	2
MLS-467	Comprehensive Review	2
MLS-453	Communications	1
	Clinical Practica*	8

Clinical Practica*

MLS-478	Patient Care Techniques	2
MLS-477	Specialty Practicum	4
MLS-471	Clinical Practice—Hematology	4
MLS-472	Clinical Practice—Microbiology I	4
MLS-473	Clinical Practice—Microbiology II	4

MLS-474	Clinical Practice—Immunohematology	4
MLS-475	Clinical Practice—Immunology/Molecular	4
MLS-470	Clinical Practice—Chemistry	4
MLS-476	Clinical Practice—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)

107 QH

Curriculum is subject to change.

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 clinical laboratory professionals who can meet the current and future demands of laboratory medicine.

Graduates are eligible to take the Medical Laboratory Scientist certification examination given by the American Society of Clinical Pathology and The National Credentialing Agency for Laboratory Personnel; upon passing these examinations, they become certified as Medical Technologists, MT(ASCP) or as Medical Laboratory Scientists, MLS(NCA). 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 Registry.

Year 1

Fall Quarter

MLS-500	Laboratory Fundamentals	2
MLS-501	Clinical Chemistry I	4
MLS-510	Hematology I	5
MLS-521	Clinical Immunology	4
MLS-544	Professional Development I	1

Winter Quarter

MLS-502	Clinical Chemistry II	3
MLS-512	Body Fluid Analysis	4
MLS-530	Microbiology	5
MLS-545	Professional Development II	1

Spring Quarter

MLS-503	Clinical Chemistry III	3
MLS-511	Hematology II	2
MLS-531	Parasitology, Mycology and Virology	4

MLS-520	Immunohematology	5
MLS-560	MLS Seminar	2
HHV-504	Ethics in Health Care: Interdisciplinary Perspectives	2

Summer Quarter

MLS-533	Molecular Techniques	5
	Clinical Practica*	4-8
CHS-502	Research Methods	3
MLS-550	Laboratory Information and Automation Systems	2

Year 2

Fall Quarter

MLS-522	Clinical Immunology II	2
CHS-510	Health Care in America	2
	Clinical Practica*	4-8
MLS-555	Clinical Laboratory Supervision and Education	2

Winter Quarter

MLS-551	Quality Issues in Clinical Laboratory Sciences	2
	Clinical Practica*	4-8
MLS-552	Regulatory Issues	2
CHS-501	Introduction to Biostatistics for the Health Scientist	3
MLS-513	Hematology Case Studies	2

Spring Quarter

MLS-562	Research Seminar III	1
MLS-567	Comprehensive Review	2
	Clinical Practica*	4-8
MLS-532	Infectious Disease Case Studies	2

Courses Completed During Year 2:

MLS-563	Master's Project I	1
MLS-564	Master's Project II	1
MLS-565	Master's Project III	1

Clinical Practica*

MLS-578	Patient Care Techniques	2
MLS-571	Clinical Practicum—Hematology	4
MLS-572	Clinical Practicum—Microbiology I	4
MLS-573	Clinical Practicum—Microbiology II	4
MLS-574	Clinical Practicum—Immunohematology	4
MLS-575	Clinical Practicum—Immunology/Molecular Biology	4
MLS-570	Clinical Practicum—Chemistry	4
MLS-576	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.

Specialist in Blood Bank Certificate Program

Rush University's Specialist in Blood Bank (SBB) certificate program offers a flexible online educational experience that does not require face-to-face classes. A Web-based course management system delivers course content online while concomitantly supporting discussion and active learning.

After completion of the program, students are eligible to take the SBB certification examination given by the American Society for Clinical Pathology (ASCP) Board of Registry. Certification by the ASCP is required for designation as an SBB. This program allows the student to work, study for the SBB exam and earn graduate credit all at the same time.

Students with extensive 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.

Minimum Admission Requirements

The following are required of the applicant to be considered for admission:

- A baccalaureate degree from a regionally accredited college or university in medical laboratory, biological or related science
- A minimum grade point average of 3.0 (on a scale of 4.0)
- Certification through ASCP or the National Credentialing Agency for Laboratory Personnel (NCA)

- A minimum of one year full-time post-baccalaureate work experience relevant to an immunohematology area within an institution accredited by a recognized accrediting agency

Curriculum

	Course	QH
Fall Quarter		
SBB-580	Human Blood Group Systems	4
SBB-581	Principles and Methods of ABID	2
Winter Quarter		
SBB-582	Blood Procurement and Blood Product Manufacturing	3
SBB-583	Blood Bank and Transfusion Service Operation	3
Spring Quarter		
SBB-584	Clinical Immunohematology and Transfusion	4
SBB-586	Clinical Practicum*	4
Summer Quarter		
SBB-585	Selected Topics and Comprehensive Review	3
SBB-587	SBB Project	1

* 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.

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

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 2.0 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 they have 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 2.0 or whose cumulative grade point average falls below 2.0. 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 2.0 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 2.0 (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.

"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

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 Clinical Laboratory Sciences. 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/medical technology. Graduates are eligible to take the Medical Laboratory Scientists certification examination given by the American Society of Clinical Pathology and The National Credentialing Agency for Medical Laboratory Personnel.

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 2.0 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 Sciences 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 conjoint

appointments in Rush Medical College. They provide the laboratory medicine courses for the medical college curriculum and the graduate nursing college curriculum.

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: 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: Curriculum

Year 1

Fall Quarter

MPH-511	Radiation Safety of Radioactive Materials	2
MPH-561	Diagnostic Radiation Physics	3
MPH-604	Transfer Function Analysis	2
MPH-601	Radiation Physics	4
MPH-621	Seminar	1

Winter Quarter

MPH-602	Radiological Physics I	4
MPH-622	Radiation Physics Lab	2
MPH-621	Seminar	1
	Elective	5

Spring Quarter

MPH-541	Physics of Nuclear Medicine I	3
MPH-603	Radiological Physics II	4
MPH-526	Radiation Biology	3
MPH-621	Seminar	1
	Elective	2

Summer Quarter

ANA-592	Anatomy	4
MPH-623	Clinical Physics Practicum	3
MPH-621	Seminar	1
	Elective	4

Year 2

Fall Quarter

MPH-562	MRI Imaging	2
MPH-623	Clinical Physics Practicum	4
MPH-621	Seminar	1
	Physiology	3
	Elective	2

Winter Quarter

MPH-623	Clinical Physics Practicum	4
MPH-564	Digital Imaging	3
MPH-621	Seminar	1
MPH-580	Research	2
	Elective	2

Spring Quarter

MPH-622	Radiological Physics Laboratory	5
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MPH-621	Seminar	1
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MPH-580	Research	6
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Hours Required for MS Degree: 80

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 a 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: Professional Certification

The Medical Physics program provides the academic preparation for certification as a radiological medical physicist by the American Board of Radiology.

Occupational Therapy: Mission and Philosophy

The mission of the Department of Occupational Therapy is consistent with that of Rush University Medical Center and that of Rush University. The Department of Occupational Therapy embraces the Medical Center's commitment to the practitioner-teacher-investigator model, which integrates patient care, education and research. The Department supports evidence-based practice and outcome-based research in order to provide excellence in health care.

The faculty of the graduate program in occupational therapy emphasizes an educational approach, which integrates occupational therapy and didactic material with clinical application and practice. The faculty members are practitioners, teachers and investigators, a

combination that infuses the curriculum with a contemporary and scholarly perspective. Graduate courses are designed to build on past knowledge and experiences, as well as to encourage active learning. The philosophy is based on adult learning theories and the belief that the learner is active in the process of learning. Throughout the curriculum the student is engaged in constructive and reflective learning opportunities. The purpose of this educational philosophy is to allow the student maximum opportunity for the highest levels of integration of content and understanding of rationale for instruction. This philosophy is fostered through such concurrent sequencing of theory and clinically based experience that the student is able to relate to either or both environments depending upon which best facilitates the learning process. The early and continuous collaboration between the theoretical and the clinical learning environments allows for the development of a collegiality between faculty and students. Through such relationships, the student's personal growth and opportunities for independent thinking are fostered. Concern for the student as an individual, mirrored in the relationship with faculty, provides the student with a variety of individualized learning options and experiences within diversified work environments.

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 at the graduate level.

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 has added to it through increased ability for creative thinking. Because of experiences in self-directed learning and in 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 graduate 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) taken within the past five years
- 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.
- Three 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 either through observation, volunteering or work experience with an OT practitioner
- An essay on familiarity with occupational therapy through experience and how this experience has confirmed the choice of occupational therapy as a career

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 and writing sample. 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 15th. The application closes on December 1st. Interviews will be held during the months of November. Enrollment is limited to up to 34 students. Applicants are encouraged to apply as early as possible.

Students accepted into the Occupational Therapy program must successfully pass a criminal background check.

Occupational Therapy: Academic Policies

Full-Time and Part-Time Enrollment

The full-time 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. Completion of all courses may take up to 51 months on a part-time basis, but the final 12 months must be conducted on a full-time basis. To be considered part-time, a student must be enrolled for a minimum of six credits and fewer than 12 credits per quarter. 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:

ACOTE

c/o Accreditation Department

American Occupational Therapy Association (AOTA)

4720 Montgomery Lane, Suite 200

Bethesda, MD 20814-3449

(301) 652-6611 x2914

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, Inc. (NBCOT). Additional information can be obtained by contacting:

NBCOT, Inc.

800 S. Frederick Avenue, Suite 200

Gaithersburg, MD 20877-4150

(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. Full-time students placed on probation must earn a cumulative grade point average of 3.0 or greater at the end of the next consecutive quarter. Part-time students placed on probation must earn a cumulative GPA of 3.0 or greater by the end of the next two consecutive quarters.

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 also will 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.

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: Full-Time and Part-Time Curricula

Full-Time Curriculum		
Summer Quarter		
OCC-502	OT History and Philosophy	4
OCC-504	Human Structure and Principles of Movement	4
OCC-505	Clinical Foundational Skills	1
OCC-506	Medical Conditions Seminar	3
Fall Quarter		
CHS-510	Health Care in America	2
OCC-503	Occupation and Health Across the Lifespan	4
OCC-507	Psychosocial Dysfunction	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-510	OT Perspectives in Ethics and Multiculturalism	3
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-525	Introduction to Neuroscience	4
OCC-531	Principles and Methods of Education	2
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-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-543	Health Care Organizations	3
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	2
OCC-583	Graduate Research Project**	6
OCC-590	Advanced Practice Seminar	4

Hours Required for MS Degree: 117

* Thesis option available. Includes courses OCC-598A, OCC-598B and OCC-598C in place of OCC-582 and OCC-583.

** 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.

Part-Time Curriculum

Summer Quarter		
OCC-502	OT History and Philosophy	4
OCC-506	Medical Conditions Seminar	3
OCC-505	Clinical Foundation Skills	1

Fall Quarter		
CHS-510	Health Care in America	2
OCC-503	Occupation and Health Across the Lifespan	4

Winter Quarter		
OCC-509	Analysis of Occupational Performance	3

OCC-510	OT Perspectives in Ethics and Multiculturalism	3
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Spring Quarter		
OCC-525	Introduction to Neuroscience	4
OCC-538	Evaluation and Assessments	3

Summer Quarter		
OCC-504	Human Structure and Principles of Movement	4
OCC-532	OT Perspectives in Technology	2
OCC-537	Issues and Perspectives in Geriatric OT	3

Fall Quarter		
OCC-507	Psychosocial Dysfunction	3
CHS-501	Introduction to Biostatistics for the Health Scientist	3

Winter Quarter		
OCC-508	Group Dynamics	3
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-531	Principles and Methods of Education	2

OCC-583	Graduate Research Project **	0
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Summer Quarter

OCC-512	OT Interventions II	5
OCC-517	OT Interventions II—Fieldwork	1
OCC-536	Issues and Perspectives in Pediatric OT	4

OCC-583	Graduate Research Project **	0
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Fall Quarter

OCC-513	OT Interventions III	5
OCC-514	OT Interventions IV	4
OCC-518	OT Interventions III—Fieldwork	1

OCC-543	Health Care Organizations	3
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OCC-583	Graduate Research Project **	0
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Winter Quarter

OCC-595	Advanced Fieldwork I	12
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Spring Quarter

OCC-596	Advanced Fieldwork II	12
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Summer Quarter

OCC-544	Management Concepts for OT	2
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OCC-583	Graduate Research Project **	6
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OCC-590	Advanced Practice Seminar	4
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Hours Required for MS Degree: 117

* Thesis option available. Includes courses OCC-598A, OCC-598B and OCC-598C in place of OCC-582 and OCC-583.

** OCC 583 Research III is a continuous course beginning in the eighth quarter with a grade and credit assigned upon completion of the thirteenth 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 36 months for full-time students and 51 months for part-time students from matriculation into the program. 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 as well as the clinical experience 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.

- Cumulative and science grade point average (GPA) of 2.9 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.

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 Education Credentials 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 course 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			Master of Science Curriculum		
Year 1			Year 1		
Fall Quarter			Fall Quarter		
PRF-301	Perfusion Technology	3	PRF-501	Perfusion Technology**	3
PRF-331	Anatomy and Physiology I	5	PRF-521	Anatomy and Physiology I	5
HHV-504	Ethics in Health Care	2	HHV-504	Ethics in Health Care	2
CHS-501	Biostatistics	3	CHS-501	Biostatistics	3
PRF-311	Junior Seminar I	3	PRF-510	Seminar I**	3
Winter Quarter			Winter Quarter		
PRF-333	Pharmacology	3	PRF-523	Pharmacology**	3
PRF-312	Junior Seminar II	5	PRF-511	Seminar II**	5
PRF-302	Pathophysiology of CPB I	5	PRF-502	Pathophysiology CPB I**	5
PRF-332	Anatomy and Physiology II	3	PRF-522	Anatomy and Physiology II	3
Spring Quarter			CHS-502	Research Methods	3
PRF-381	Project Design and Research	3	Spring Quarter		
			PRF-541	Project Design/Research	3
PRF-303	Pathophysiology of CPB II	5	PRF-503	Pathophysiology CPB II *	5
PRF-313	Junior Seminar III	3	CHS-510	Health Care in America	2
CHS-510	Health Care in America	2	PRF-512	Seminar III**	3
Summer Quarter			PRF-552	Advanced Topics: Cardiac Pharmacology	2
PRF-441	Project Design and Research I	2	Summer Quarter		
			PRF-542	Masters Project I	2
PRF-451	Senior Seminar I	2	PRF-531	Clinical Experience I**	10
PRF-431	Clinical Experience I	10	PRF-513	Seminar IV**	2
Year 2			Year 2		
Fall Quarter			Fall Quarter		
PRF-442	Project Design and Research II	2	PRF-543	Masters Project II	2
PRF-432	Clinical Experience II	10	PRF-532	Clinical Experience II**	10
PRF-452	Senior Seminar II	2	PRF-551	Advanced Topic: Cardiac Physiology	2
Winter Quarter			Winter Quarter		
PRF-443	Project Design and Research III	2	PRF-544	Masters Project III	2
PRF-433	Clinical Experience III	10	PRF-533	Clinical Experience III**	10
Spring Quarter			PRF-554	Advanced Topics: Educational Methods**	2
PRF-444	Project Design and Research IV	2	Spring Quarter		
PRF-434	Clinical Experience IV	10	PRF-545	Masters Project IV	2
PRF-452	Senior Seminar III	2	PRF-534	Clinical Experience IV**	10
Hours Required for BS Degree:		99	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 will prepare students to practice as primary care providers, as well as provide a unique opportunity for advance practice experience in one of the following clinical areas: orthopedic surgery, cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine and pulmonary and critical care medicine.

Rush University is excited to offer this PA training opportunity in our renowned medical facility. For more information about the program, visit our 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 Rush University Physician Assistant program is to train qualified general and advanced practice physician assistants to practice medicine with competence, professionalism and compassion driven by academic excellence in scholarship, 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:

Prepare highly qualified physician assistants to take leadership roles in clinical practice, research and service to the community and to the profession.

Provide clinical leadership training in areas of medical practice such as surgery, orthopedics, pulmonary and critical care medicine, emergency practice and internal medicine.

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 the 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 298 in the new scoring system, is required for interview and admission consideration. The score must be attained at a single seating of the exam. If you take the GRE more than once, batched and partial scores are not accepted.
- A combined score of 1,200 and above, or 308 in the new scoring system, is considered very competitive.
- Original copies of your GRE scores must be sent directly to Rush University. **Our GRE code is 3263.**
- 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 direct patient contact experience is required at the time of application submission. Having 1,500 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 you 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.
- Knowledge of medical terminology. Proficiency of medical terminology is assessed during the interview process. More information regarding this is provided with an interview invitation.
- Admission is contingent upon successful completion of a 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 Education Credentials Evaluators (ECE)

- TOEFL scores, if English is not your 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 e-mail at: 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)
Organic Chemistry (with Lab preferred but not required)	3
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	21 and above

It is strongly recommended that all courses be taken within seven (7) 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. Maneuver effectively throughout the day 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.
2. Move and position patients, and perform physically demanding tasks such as cardiopulmonary resuscitation.
3. Communicate effectively with patients and their families, physicians, and other health care workers orally, in writing, or via the use of electronic medical records and e-mail.
4. Hear conversational levels of speech from patients and staff, respond to alarms, and use a stethoscope to assess breath sounds.
5. Accurately measure medications, read patient records, evaluate information displayed on patient monitors, and make patient status observations.
6. Manipulate equipment and perform technical procedures such medication administration, phlebotomy, I.V. catheter insertion, intubation, and be able to assist in surgery.
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 emergency situations.

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

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	1
PAS-514	Diagnostic Methods I	2

Quarter II: Fall

CHS-502	Research Methods and Statistics	5
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HHV-504	Ethics in Health Care	2
GCC-520	Intro to Pharmacology and Physiology I	3

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	3
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-522	Intro to Pharmacology and Physiology III	3
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CHS-510	Health Care in America	2
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PAS-541	Clinical Medicine III	5
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PAS-542	Fundamentals of Surgery	3
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PAS-543	Psychosocial Medicine	1
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PAS-545	Emergency Medicine	3
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Quarter Hours for Phase I: 70

Phase II: Core Clinical Program (Typical Sequence)

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
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PAS-586	Behavioral Health	4
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PAS-587	Long-Term Care/Geriatrics	4
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Quarter IV: Spring

PAS-588	Emergency Medicine	4
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PAS-589	Elective Rotation	4
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PAS-580	Master's Research Project	2
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Quarter Hours for Phase II: 50

Phase III: Clinical Specialization (Typical Sequence)

Quarter I: Summer

PAS-590	Advanced Clinical Practice	10
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Quarter II: Fall

PAS-590	Advanced Clinical Practice	10
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Quarter III: Winter

PAS-590	Advanced Clinical Practice	10
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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, 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. Students in the program will work with faculty and scientists to learn research methods, data analysis, and descriptive and inferential statistics in order to develop an understanding of how principal investigators design and perform research. As part of the program, students must complete a practicum experience and an investigational research project in their chosen area of specialization to be submitted for publication and/or formally presented at an appropriate professional meeting, thus further advancing the profession 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 to 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 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. Students in the program will work with faculty and scientists to learn research methods, data analysis and descriptive and inferential statistics in order to develop an understanding of how principal investigators design and perform research. As part of the program, students must 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, thus further advancing the profession of research administration.

Practicum Requirement

As a part of the prescribed plan of study, students must choose an area of concentration in order to complete the practicum series. 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, and intellectual property and technology transfer.

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 organization. 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 (RU-Learning) 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 either offered 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

Through the research project, students will increase their knowledge within the discipline, promote interdisciplinary collaboration and advance the science and practice of research administration by providing a link between basic science research, clinical research and management practice. As a part of the prescribed plan of study, students must choose an area of concentration in order to complete the practicum series. 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, and intellectual property and technology transfer. Following the initial practicum experience, which is designed to introduce students to working in each of these areas, students may then choose one of these areas for a second concentrated practicum experience: grants administration, project management, budget and fiscal management, compliance and audit, or intellectual property and technology transfer.

Research Administration: Admission Requirements

General Education Requirements

Prospective students must have a bachelor's degree or the equivalent from an 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 within the last five years) (optional)
- Letters of recommendation (three letters are suggested)
- A letter identifying a possible site for the practicum*

* This is a distance-learning program and Rush cannot provide the necessary practicum experience to all students. It is the student's responsibility to identify a practicum site either at their place of employment or near their home. This letter is optional, as the practicum does not begin until the summer quarter, but students cannot progress through the program without the practicum and applicants with an identified site/mentor for a practicum will be given priority for admission.

We will work with you to secure the necessary agreements with the site you identify and assure that the practicum meets the standards of the program. Students with more than five years of experience in the profession may apply for a waiver of the practicum requirement subject to the review and approval of the Dean of the College of Health Sciences and the University Registrar.

Application Procedure

Application for admission into the Masters of Science in Research Administration should be made through the Rush University Admissions. Prospective applicants may submit transcripts and a request for an unofficial evaluation to the Rush University Admissions, 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.

Research Administration: Curriculum

Students accepted into MSRA program begin coursework in the fall quarter of the first year of the program.

Year 1

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

RSA-596A	Practicum I	4
RSA-598A	Research Project I	2

Year 2

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

RSA-596B	Practicum II	4
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Hours Required for MS Degree: 46

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 (an 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 Masters Program will be a distance learning program. We expect that there will be a number of students from the State of Illinois, but residency in the State of Illinois will not be required.

Research Requirements

The student enrolled in the Master of Science in Research Administration Program will be required to complete a research paper in order to graduate. The mentoring of this program requirement will be completed through courses RSA-598A, RSA-598B and RSA-598C under the supervision of the student's faculty mentor.

Qualifying or Comprehensive Examination Requirements

The capstone of the Master Program will be the research project. There will not be a requirement for a qualifying or comprehensive examination.

Practicum, Internships, Clinical or Field Experience Requirement

As a part of the prescribed plan of study, students must choose an area of concentration in order to complete the practicum series. 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, and intellectual property and technology transfer. Following the initial practicum experience, which is designed to introduce students to working in each of these areas, students may then choose one of these areas for a second concentrated practicum experience: grants administration, project management, budget and fiscal management, compliance and audit, or intellectual property and technology transfer. If the student is currently employed in the Research Administration Profession at an academic institution or research institute, the two Practicum Courses (RSA-596A and RSA-596B) can be completed at their current institution. If the student is not employed at an academic institution or research institute, the student's faculty mentor will assist in placement to complete the practicum requirement. Students with more than five years of experience in the profession may apply for a

waiver of this requirement subject to the review and approval of the Dean of the College of Health Sciences and the University Registrar.

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: Philosophy

Respiratory care, also known as respiratory therapy, is the allied health profession responsible for caring for patients with deficiencies and abnormalities of the cardiopulmonary system. Respiratory care is a dynamic and exciting health profession offering many opportunities for the new graduate.

Areas of respiratory care include basic care (oxygen, aerosol and chest physiotherapy), critical care (ventilator management and physiologic monitoring), perinatal and pediatric respiratory care, cardiopulmonary diagnostics, pulmonary laboratory, skilled nursing, restorative, subacute, home care and pulmonary rehabilitation.

The respiratory therapist may often see a diverse group of patients ranging from the newborn and pediatric patients to adults and the elderly. Disease states or conditions often requiring respiratory care include asthma, emphysema, chronic obstructive lung disease, pneumonia, cystic fibrosis, infant respiratory distress and conditions brought on by shock, trauma or postoperative surgical complications.

Respiratory therapists also are also involved in many specialty areas in the hospital such as newborn labor and delivery, neonatal and pediatric intensive care units, pulmonary function laboratory, sleep laboratory, adult intensive care units, extracorporeal membrane oxygenation (ECMO) and EKG testing. Therapists may also be employed in physicians' offices, clinics, extended care facilities or working in home care.

Respiratory Care: Program Overview

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 advance 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 advance standing programs may be admitted with some program prerequisites and/or general education outstanding.
- Submission of Graduate Record Examination (GRE) scores is encouraged but not required (from an examination taken within five years of the date of application to the program).
- 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, 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 National Board for Respiratory Care'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 a 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 such transfer credit in such coursework in cases 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). 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 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

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

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 are 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**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
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Elective (Ethics, Statistics) 2

Summer Quarter

RC-401	Education*	5
RC-402	Management*	5
	TOTAL	10

Year 2**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
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Summer Quarter

RC-603	Introduction to Research*	5
RC-404	Clinical Observation II	2
	TOTAL	7

*Electives

Year 3**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**

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
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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 their 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 other 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 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 Semester Credit Hours	61 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

Fall Quarter

RC-511	Introduction to Respiratory Care	5
RC-512	Cardiopulmonary Physiology	5
RC-513	Respiratory Equipment and Techniques	5
IDS-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	2

Summer Quarter

RC-561	Education	5
RC-562	Management	5
RC-563	Introduction to Research	5
RC-564	Clinical Observation	2

Year 2

Fall Quarter

RC-571	Clinical Practice I	12
RC-572	Clinical Seminar I	3
RC-573	Research Project	2

Winter Quarter

RC-581		
RC-582	Clinical Seminar II	3
RC-583	Research Project	2

Spring Quarter

RC-591	Clinical Practice III	12
RC-592	Clinical Seminar III	3
RC-593	Research Project	2

Total Hours for Respiratory Program: 119

Three-Year Track Option—MS 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 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 are 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

Fall Quarter

RC-512	Cardiopulmonary Physiology	5
IDS 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

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	Research	5
RC-564	Clinical Observation II	2

Year 3

Fall Quarter

RC-571	Clinical Practice I	12
RC-572	Clinical Seminar I	3
RC-573	Research Project 2	2
Total Hours for Respiratory Care Program		119-121

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
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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 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. 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 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 dismissed and 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 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 complete the written registry examination (WRRT) and clinical simulation examination (CSE). The examination will be taken during the spring session of the second year as a part of RC-432, Clinical Seminar III. The examination fee is

approximately \$390.00. A passing score and successful achievement of the registry (RRT) credential is required to successfully complete RC-432, as well as meet graduation and program completion requirements (see Graduation Requirements). Students who do not successfully complete the RRT examination will receive an Incomplete ("I") for RC-432 and will retake the examination. Those failing the examination twice may be enrolled in RC-432 as a directed Independent Study during the summer quarter 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

Each student is expected to conduct oneself 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.

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.

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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 dismissed and 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 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.

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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 students 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 complete the written registry examination (WRRT) and clinical simulation examination (CSE). The examination will be taken during the spring session of the second year as a part of RC-592, Clinical Seminar III. The examination fee is approximately \$390.00. A passing score and successful achievement of the registry (RRT) credential is required to successfully complete RC-592, as well as meet graduation and program completion requirements (see Graduation Requirements). Students who do not successfully complete the RRT examination will receive an Incomplete ("I") for RC-592 and will retake the examination. Those failing the examination twice may be enrolled in RC-592 as a directed Independent Study during the summer quarter 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

Each student is expected to conduct oneself 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.

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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
- Successful completion of the National Board for Respiratory Care entry-level examination (CRT) or an equivalent departmental examination
- Successful completion of the National Board for Respiratory Care Registry examinations (WRRT and CSE) for Advanced Respiratory Therapists (RRT) or an equivalent departmental examination
- 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
- Successful completion of the National Board for Respiratory Care entry-level examination (CRT) or an equivalent departmental examination
- Successful completion of the National Board for Respiratory Care Registry examinations (WRRT and CSE) for Advanced Respiratory Therapists (RRT) or an equivalent departmental examination
- Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Support (PALS), and Neonatal Resuscitation Provider (NRP) course completion
- Successfully complete a departmental research project
- Completion of all University requirements for graduation

Vascular Ultrasound and Technology: Mission and Goals

Mission

The mission of the Department of Vascular Ultrasound and Technology 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 knowledge, skills and behavior 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 Department of Vascular Ultrasound and Technology 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, student laboratory work and observation of patient examinations. The second-year students perform the vascular examinations learned during 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 for the Accreditation of Allied Health Educational Programs (CAAHEP) at 1632 Clearwater, FL and www.caahep.org, through the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS). More information regarding accreditation is located at www.rushu.rush.edu/catalog/aboutrush/accredauthlic.html.

Vascular Ultrasound and Technology: Admission Requirements

- A minimum of 90 quarter (60 semester) hours earned at an accredited college or university are required.
- The minimum 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. The majority of students admitted in the previous two years had a GPA over 3.00.
- 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 Hours	Quarter 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

Requirements	Semester Hours	Quarter Hours
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 or radiologic physics is required. Chemistry is highly recommended.	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 Hours of Required and Elective Courses	60	90

Applicants who have taken their prerequisite coursework at a university outside the United States must have their coursework evaluated by the Education 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 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.
- 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 (<http://www.rushu.rush.edu/catalog/acadprograms/chs/chsacadappeal.html>).

College of Health Sciences/Rush University Academic Policies

Academic policies specific to the College of Health Sciences are located at <http://www.rushu.rush.edu/catalog/acadprograms/chs/chsacadpolicies.html>. In addition, the [Academic Resources and Policies](#) section of this catalog contains Rush University academic policies.

Vascular Ultrasound and Technology: Curriculum

Year 1

Fall Quarter

VAS-301	Vascular Anatomy, Physiology and Pathophysiology	3
VAS-304	Vascular Terminology	1
VAS-310a	General Pathophysiology I	2
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-310b	General Pathophysiology II	3
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

Spring Quarter

VAS-354	Transcranial Doppler (TCD)	1
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
IDS-510	Health Care in America	2

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

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

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-433	Senior Lectures/Case Presentations III	1

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-480	Vascular Ultrasound Comprehensive Review	2

Hours Required for BS Degree: 96

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. The Graduate College offers both doctoral and master's programs across an array of exciting healthcare professions. Our goal is to provide skills and insights to prepare our graduate students to be leaders and innovators in a complex and rapidly changing world of biomedicine. Our curriculum arises from a multidisciplinary environment totally focused on healthcare delivery and discovery at a leading Chicago academic medical center. Our faculty includes a wide range of highly accomplished and nationally impactful researchers and educators. Thank you for your interest in our College and we look forward to working with you in advancing your professional career goals.

James L. Mulshine, MD
Professor,
Dean of The Graduate College (Acting),
Associate Provost of Research,
Vice President, Research

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 all divisions. Using the practitioner-teacher model, faculty work side by side with the students in an effort to cure disease and bring the newest possible treatments to the patients. The College promotes cooperative efforts in achieving high-quality educational and research programs to prepare students for successful careers and 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

The Graduate College was originally established to provide opportunities for students to work with selected members of the University faculty to earn doctoral degrees in the sciences basic to health care. Students underwent highly individualized programs that maximized the students' opportunities for self-realization and the faculties' opportunities for sharing their scholarly development, expertise and experiences on a personal basis. This goal is still a major emphasis of The Graduate College during the research training years, whereas there is a more common framework taught in the period preceding the mentored research experience. Thus, most basic science students now take an introductory core curriculum. This contributes to significant interaction among the students across divisions while providing a common knowledge base to enter the research phase of their specific programs. It also serves to create a feel of critical mass in divisions that only matriculate a few students each year. The addition of master's programs in Clinical Research and Biotechnology have expanded the course offerings by the College and address the expanding need for clinical scientists and highly trained technical staff, respectively, needed to advance science in the 21st century. Therefore, the organizational pattern still allows a high

degree of individualized faculty and student participation in the educational processes of the College consistent with the teacher-practitioner model while providing a more encompassing umbrella structure within the College that creates greater similarity than differences across the divisions and programs.

The Graduate College: Organization

To facilitate its educational mission, the College is organized into divisions; each division represents a separate discipline and each is related to its parent academic department. Currently, the College has the following divisions:

- Anatomy and Cell Biology
- Behavioral Sciences (Inactive)
- Biochemistry
- Biomechanics
- Health Sciences
- Immunology/Microbiology
- Medical Physics
- Pharmacology
- Neuroscience
- Nursing Science
- Molecular Biophysics and Physiology

The primary goal of each division is to provide excellent graduate education in the sciences basic to medicine. The divisions of the College are flexible and responsive to the changing needs and experiences in their disciplines. To that end, divisions are headed by directors who serve for definite terms of appointment and whose re-appointments are subject to periodic review. Each division reports through its director to the Dean of The Graduate College and is a member of The Graduate College Council. The Graduate College Council is the senior representative body of the college. Its membership includes all division directors, 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 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 divisions also

establish policies and procedures for their students consistent with their goals. The Graduate College Council periodically reviews 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

Programs

In addition to divisions, The Graduate College oversees two additional programs. These programs are:

- Clinical Research
- Biotechnology

Neither of these programs resides in a division, both 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:

1. Deadline for applications: 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, all supporting documents must be received by August 15. (Some programs may have earlier deadlines. Please check with the individual program director early in the application process.)
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 strongly 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 or WES is required of all students who have completed their last degree outside of the US.
- 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 at which English is the language of instruction, must submit scores from TOEFL or IELTS. Recommended scores are as follows: TOEFL 620 (paper based); 260 (computer based); with a minimum of 84, with subscores of Reading 19, Listening 17, Speaking 20 and Writing 21, OR IELTS 6.5, with subscores of 6.0 for all four subscores.

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 three consecutive quarters (fall, winter 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 comprise 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 Writing Practicum
- 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-522 Introduction to Physiology and Pharmacology III
- 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. Nondegree students are not admitted with advanced degree objectives and are ineligible to become candidates for advanced degrees. Upon approval by a course director, 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 who fail to achieve admission to candidacy, but have otherwise

completed all other pre-requisites, 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 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 e-mailing 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 comprised 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. At least two member 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 quarter 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 his or her 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 the Clinical Research students and students within the divisions of Nursing and Health Sciences. Full-time students must register for at least 12, but not more than 18, quarter hours per

quarter. 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 three quarters (12 hours per quarter). Part-time students earning a master's degree must be enrolled a minimum of two quarters per academic year. The minimum requirement for graduation from the college is 48 hours with a minimum of 24 completed as a student in the College. 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 the first quarter of official enrollment.

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 quarter in which the student formally matriculates. A student exceeding that time limitation must submit to the Graduate Council, in writing, a request to extend their 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 sequence 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 division'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 a plan 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 their 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 quarter. 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, the Dean and to 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, 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 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

Curriculum Committee

This committee reviews all courses and programs of study, including new programs and courses, and makes recommendations to The Graduate College Council.



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)

Medical Physics (MS and PhD)

Molecular Biophysics and Physiology (PhD)

Neuroscience (PhD)

Nursing Science (PhD)

Pharmacology (MS and PhD)

Anatomy and Cell Biology: Philosophy

The Division of Anatomy and Cell Biology offers study both at 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 that 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, as 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, both in 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 since the course cycle begins in the fall quarter. 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 course 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 dictated by 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 programs.

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 Web site; 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, 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 quarter. 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, encouraged to explore material from historical or contemporary perspectives in the literature, perform and demonstrate special dissections, and to 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.

Required Coursework	PhD	MS
Core Anatomy Courses:		
ANA-513 Anatomy I		15
ANA-514 Anatomy II	24	(two or more)
ANA-511 Histology	(all four)	
ANA-512 Neurobiology		
ANA-581 Research Methods in Anatomy	4	4
ANA-590 Special Topics in Anatomy	2+	2+
GCC-501 to 514 Cell/Molecular Biology	3+	3+
GCC-506 Biomedical Ethics	1	1
GCC-507 Medical Research Strategies/ Statistics (or equivalent)	2	2
Electives (other core or extra- departmental)	2+ recommende	3+
Teaching Assistantships	d	n/a
Journal Club (ANA-595)	9	6
Research (ANA-699 PhD/ANA-599 MS)	72+	12+
Minimum Hours	138	49

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 in 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 core course requirements 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.

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 comprised of five members with at least one member from outside the division. An extramural 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 United States 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 stand 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, Jelke Building and in the Cohn Research 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 to 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.

As a 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 include:

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, Sena)

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, Sena, 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)

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)

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 Metastasis

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. Our 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)

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 cancer 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: Philosophy/Division Overview

The Division of Biochemistry offers a master's (MS) and doctoral (PhD) degree 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 normally admitted in the fall quarter, but the Graduate Program Committee may at its discretion recommend admission for the winter, spring, or summer quarter. 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) 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 quarter of the student's first academic year (usually at the beginning of September; the academic year begins with the fall quarter), the student sits for the Preliminary Examination,

which is a combination of a written examination, take-home examination and oral examination. By the end of his or her second academic year (i.e., before the fall quarter 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 June commencement ceremony, all requirements for the PhD degree must be met by mid-May.

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.

Quarter 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.

Required Courses

A total of 45 quarter hours of formal coursework are required, as shown below.

Required Courses for Graduate Students in the Division of Biochemistry

BCH-571	Medical Biochemistry	5
BCH-581	Biochemical Methodology I	4
BCH-582	Biomedical Methodology II	4
BCH-595	Journal Club	2 (per year)
BCH-624	Connective Tissue Biochemistry	3
BCH-698	Introduction to Research	1
GCC-501	Molecular Biology: Genome to Proteome	3
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	3
GCC-503	Functional Cell Biology	2
GCC-504	Functional Tissue Biology	3
GCC-506	Biomedical 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	10

Total Hours of Required Coursework, less BCH-595 hours: 45

A full-time student registers for a minimum of 12 credit hours each quarter. 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 quarter even though the student may not have begun their laboratory research. A student not taking any formal courses must register for 12 hours in BCH-699 or BCH-598. The 10 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 their 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 "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 third quarter of the student's first year, or earlier. Students are expected to remain on campus during the summer quarter, registering for 12 quarter hours of BCH-699 (unless taking a formal course). The summer quarter 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 the PhD students except 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

Fall Quarter

BCH-581	Biochemical Methodology I	4
BCH-698	Introduction to Research	1
BCH-699	Research in Biochemistry	1
GCC-501	Molecular Biology	3
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	3
GCC-511	Readings in Molecular Biology	1
GCC-512	Readings in Cellular Biochemistry	1

Winter Quarter

BCH-571	Medical Biochemistry	5
BCH-582	Biochemical Methodology II	4
BCH-699	Research in Biochemistry	1
GCC-506	Biomedical Ethics	2
GCC-503	Functional Cell Biology	2
GCC-513	Readings in Functional Cell Biology	1
GCC-504	Functional Tissue Biology	3
GCC-514	Readings in Functional Tissue Biology	1

Spring Quarter

BCH-624	Connective Tissue Biochemistry	3
BCH-595	Journal Club	2
BCH-699	Research in Biochemistry	1
GCC-508	Writing Practicum	2
	Select Advisor	

Summer Quarter

BCH-699	Research in Biochemistry	12
	Preliminary Examination	

Year 2

Fall Quarter

BCH-699	Research in Biochemistry	8
	Electives	4

Winter Quarter

BCH-699	Research in Biochemistry	9
	Electives	3

Spring Quarter

BCH-699	Research in Biochemistry	7
	Electives	3
BCH-595	Journal Club	2
	Dissertation Proposal	

Subsequent Years BCH-595 Journal Club each spring quarter, any additional electives and BCH-699 to give a total of 12 credit hours each quarter until 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 quarter-by-quarter 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 quarter 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 third quarter, sitting for the Preliminary Examination in the fall preceding the 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.

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 division 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 analyses 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 interview 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 quarter 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 their 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, their academic and

research performance, and their 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 quarters, there is minimal research as classroom studies are emphasized. During these quarters, master's Graduate College students take the Graduate Core Curriculum (GCC) classes, required pharmacology (PHR) course and required Biomechanics (BMC) courses. The summer quarter 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 Quarter

BMC-501	Statics and Dynamics	4
BMC-502	Strength and Properties of Material	4
BMC-511	Biomechanics	4

Winter Quarter

ANA-503	Anatomy	4
GCC-503/513	Functional Cell Biology	2/1
GCC-504/514	Functional Tissue Biology	3/1
GCC-506	Biomedical Ethics	1

Spring Quarter

BMC-513	Kinematics of Human Motion	4
GCC-508	Writing Practicum	2
BMC-503	Introduction to Research	1
BMC-512	Bioengineering Materials	4
BMC-504	Journal Club	1

Summer Quarter

BMC-521	MS Thesis	12
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Year 2

Fall Quarter

PVM-546	Principles of Biostatistics	3
BMC-514	Spine Biomechanics	4
BMC-521	MS Thesis	5

Winter Quarter

BMC-521	MS Thesis	12
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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 in the biomedical sciences and acquaint the students with the biomedical literature. PVM-prefixed courses are specific to the Division of Pharmacology. 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 72 quarter hours of academic coursework taken at the graduate level that consists of core courses in biomechanics, strength and properties of biomaterials and basic anatomy (20 quarter hours); research core courses in biostatistics, writing practicum, ethics and journal club (8 quarter hours); professional track course in cell and tissue biology, kinematics of human motion and spine biomechanics (15 quarter hours); and thesis work (29 quarter 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 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 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: 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 a 3.0, the student may not be permitted to register for subsequent courses or quarters 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 herself or himself 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: 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 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 e-mailing 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 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 quarter. 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 you will be required to have an exit interview and provide us with feedback concerning your experience here 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.

Biomechanics: Faculty Research Interests

Dr. Alejandro Espinoza develops methods to analyze joint/spine motion and loading patterns in both normal populations as well as in 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. Kharma Foucher is interested in determining how gait biomechanics may be involved in the initiation and progression of hip osteoarthritis, and recovery from total hip arthroplasty. Her current projects include developing biomechanical biomarkers of hip osteoarthritis, establishing biomechanical predictors of clinical and functional recovery after total hip arthroplasty and examining the relationship between hip morphology and gait in femoroacetabular impingement. Dr. Foucher is also the co-director of the Motion Analysis Lab.

Dr. Tibor Glant works on the mechanisms and genetics of a murine model of human rheumatoid arthritis. A number of genetically altered mouse strains mimicking/carrying the major genetic defect in human patients are established, genomic sequences are performed and genetic defects in disease-causing genes was and being identified.

Deborah J. Hall, BS, studies retrieved implants and evaluates tissues from human retrievals and animal studies.

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 orthopaedic implants; corrosion and wear of metallic biomaterials; 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. Katalin Mikecz examines extracellular cell migration in inflammation, including arthritis, and how these cells move to the joints, and then to regional lymph nodes. The extra-articular migration of labeled cell is followed/monitored by two-photon microscopy in live animals.

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 lumbar spine with varying degree of degenerative disease and understand how adjacent disc disease progresses in patients.

Dr. Tibor Rauch's research areas include the epigenomic alterations in periprosthetic fibroblasts (and other cells), which may affect/control and are involved in periprosthetic osteolysis and loosening of prosthetic devices.

Dr. Thomas M. Turner develops novel animal models to investigate current clinical problems in orthopedic surgery, including spine, adult reconstruction, foot and ankle, and sports medicine.

Robert M. Urban is the Director of the Biocompatibility and Implant Pathology Laboratory. His research is concerned with the host response to materials used in reconstruction of bone and soft tissues, including metal alloys, ceramics, synthetic polymers, and processed allografts and xenografts and with the performance of these implants.

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 training program designed to prepare the student for a research career in the pharmaceutical and biotechnology industries or the university laboratory. 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, including Experimental Design, Experimental Models in Disease, Tools for Research, Biostatistics, Research Ethics, Scientific Writing and 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 is also an excellent preparation for further graduate school or professional program training.

Biotechnology: Curriculum

Fall Quarter

BTN-522	Experimental Design	2
	Laboratory Techniques I (introduction to laboratory; good laboratory practices; data management)	3
BTN-531		
BTN-532	Laboratory Techniques II (tissue culture; cell sorting)	3
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	3
GCC-501	Molecular Biology and Human Genetics	3
GCC-520	Introduction to Pharmacology and Physiology I	3
BTN-524	Communications and Laboratory Management	2

Winter Quarter

BTN-523	Tools for Research	2
	Laboratory Techniques III (electrophoresis; genomics; transformation; transfection; PCR)	3
BTN-533		
	Laboratory Techniques IV (study design; animal handling; surgical techniques)	3
BTN-534		
GCC-503	Functional Cell Biology	2

GCC-504	Functional Tissue Biology	3
GCC-521	Introduction to Physiology and Pharmacology II	3
Spring Quarter		
BTN-521	Experimental Models in Disease	2
GCC-522	Introduction to Physiology and Pharmacology III	3
	Laboratory Techniques V (ELISA; chromatography; densitometry/imaging)	3
BTN-535		
	Laboratory Techniques VI (histo- and immunochemistry; microscopy)	3
BTN-536		
GCC-507	Biomedical Statistics	2
GCC-508	Writing Practicum	2
GCC-505	Research Ethics	1

Hours Required for MS Degree 51

Biotechnology: Admission Requirements

New admissions to the biotechnology program are offered for the fall quarter only. Applicants who plan a full-time enrollment are given preference into the program. A split-year option is available only under specific circumstances and available to Rush employees only. The Graduate College feels that a qualified and dedicated student can complete the requirements of the full-time curriculum within the three-quarter 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. The College's requirements are as follows:

1. **Deadline for applications:** All F-1 visa holders are encouraged to apply by March 15. For U.S. students, applications are received until class is filled; however, all supporting documents must be received by August 15.
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 strongly 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 or WES 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 at which English is the language of instruction, must submit scores from TOEFL or IELTS. Recommended scores are as follows: TOEFL 620 (paper based); 260 (computer based); minimum of 100 with equally strong subscores of Reading, Listening, Speaking and Writing, OR IELTS 6.5, with subscores of 6.0 for all four subscores.
3. Acceptance letters: Official acceptances for students will come only from the Dean's office. No students will be accepted after August 15 unless they had been 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 themselves 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 M.S. 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 Advisory Committee 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 (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 Masters of Science program is designed to train health care professionals to perform and evaluated clinical research. This

program is in the Rush Graduate College. The two-year, thesis-requiring program involves one year of didactic lectures 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 is interactive and requires discussion of experimental design issues and historically important clinical trials. 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 of clinical research and obtaining federal or industrial funding for a successful academic career.

Clinical Research: Admission Requirements

This program is targeted to health care professionals with advanced degrees including MD, PhD or PharmD degrees. Students with other degrees including nursing degrees and experience in clinical trials may also apply. Many students in the program are physicians in fellowship programs at Rush and Stroger Hospitals. 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 15th, although exceptions can be made. Applicants must enter the program in the fall quarter, which starts 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 scores 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. Before matriculating into the program, the individual responsible for the student's time (e.g., fellowship training director) must agree that the student will be available for classroom work and IRB attendance to ensure that no conflict exists between class time and clinical responsibilities.

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 Quarter

GCC-551	Ethics in Biomedical Research and the IRB	2
GCC-552	Introduction to the Regulatory Process: Drug Discovery and Development	3
GCC-546	Principles of Biostatistics I	3

Winter Quarter

CRE-557	Clinical Trials I (intro to clinical research)	3
GCC-547	Principles of Biostatistics II	3
PVM-553	Observational Epidemiology	1
GCC-548	Bioinformatics	1

Spring Quarter

CRE-558	Clinical Trials II (intro to clinical research)	3
PHR-556	Tools for Research	2
GCC-593	Introduction to Grantsmanship	1
PVM-553	Observational Epidemiology	1

Summer Quarter

CRE-597	Thesis Research	5
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Year 2

Fall Quarter

CRE-597	Thesis Research	5
CRE-523	Readings in Clinical Research	2

Winter Quarter

CRE-597	Thesis Research	5
CRE-559	Readings in Special Populations	2

Spring Quarter

CRE-597	Thesis Research	5
CRE-523	Readings in Clinical Research	2

Minimum of 48 credits to graduate

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 trainee 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 trainee's status and officially place the trainee on academic probation for a period of one quarter. The course director will develop a remediation plan to ensure the trainee has mastery of the subject area covered. Required courses are GCC-551, 552, 546, 557, 558, 556 and 593.

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 quarter. These are typically research hours (GCC-597 or GCC-598) 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 quarter of year I. The student and mentor will further refine the proposal in the summer quarter of the beginning of the second year. Only clinical projects will be considered for this program. Basic science projects will not be appropriate for the thesis. The student is expected to complete all of the data collection by the beginning of the spring quarter for submission of the thesis by the end of the spring quarter of the second year.

Minimum Credit Hours Required

Successful completion of the clinical research program requires 48 quarter 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 12 credit hours per quarter. This option places the student in a clinical or laboratory environment 10 hours per week, performing research with a clinical research scientist, enabling a 12-credit hour per quarter experience. These internships should be established as part of the application process and will require the student and the mentor to come to agreement on the scope and duration of the internship.

Clinical Research: Thesis Process

Students will have entered the program with an identified mentor and a probable identified source of clinical data. During the 3rd and 4th quarters of the program, the student and mentor will begin to outline the research project. 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) can be submitted. By the end of the winter quarter the student will submit the project in the form of a scientific abstract (500 words) with anticipated methods, statistical analyses, power analysis and outcomes. The Program Director will approve the abstract. Once approved, an IRB application must be submitted immediately. The student and mentor will identify two additional readers for the thesis, who together with the mentor, will serve as the student's thesis committee. The student will then collect and analyze the data.

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 of degree completion. All students will present their work publicly in May prior to graduation. The mentor and at least one reader must sign the completed thesis document suggesting that a majority of the committee had accepted the thesis. There are no written or oral qualifying exams for the program.

Clinical Research: Academic Policies

To remain in good standing, The Graduate College requires that the student has a passing ("B" or higher) cumulative average for all required coursework.

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, major 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 will be processed directly by the Graduate Student Council and those council meetings will be chaired by the Associate 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 for all required courses. The student's advisor and the Program Director must approve the student's thesis. The student must complete a thesis that has been accepted as meeting format requirements for a master'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: Program Overview

The Doctor of Philosophy in Health Sciences (PhD) degree program 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.

Please see the program detail listed under the College of Health Sciences section of this catalog for more detailed program information.

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 quarter. 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. We do not assign minimal GRE or TOEFL scores. 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 Quarter

GCC-501	Molecular Biology: Genome to Proteome	3
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	3
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-615	Pre-Dissertation Research	1

Winter Quarter

GCC-503	Functional Cell Biology	2
GCC-504	Functional Tissue Biology	3
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

Spring Quarter

IMM-509	Basic Immunology III	1
IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-515	Research Seminar	1
IMM-600	Laboratory Rotations	9

Summer Quarter

IMM-615	Pre-Dissertation Research (A pre-candidacy examination for doctoral candidates—described below)	12
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Students in the PhD track must complete the requirement for a Pre-Candidacy Examination (PCE) by the end of the Summer Quarter. 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 grant application format and should be no more than 15 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). Students who fail the PCE will be asked to take a comprehensive written examination in immunology. 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 Quarter. After all core courses are completed, a student will be evaluated by the GAC for her or his 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 Quarter of the second year.

Second Year to Completion of the Program:

The classes required during the second year are:

Year 2

Fall Quarter

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

Winter Quarter

IMM-610	Special Topics	2
IMM-515	Research Seminar	1
IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-615	Pre-Dissertation Research	8

Spring Quarter

IMM-520	Advanced Readings in Immunology and Microbiology	1
IMM-515	Research Seminar	1
IMM-615	Pre-Dissertation Research	10

Summer Quarter

IMM-615	Pre-Dissertation Research	12
PhD students should defend a dissertation proposal to move to candidacy.		

Before the start of the Fall Quarter, the student will select a laboratory and advisor for their dissertation research. The student and advisor will submit a list of faculty for their 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 her or his plan for dissertation research and submit the proposal to her or his SDAC during the Spring or Summer Quarter of the second year. The SDAC must approve both the written document and oral defense of the document before the end of the Summer Quarter. Preliminary data should be included, if available, but it is 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 Quarter, 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 Quarter 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 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, Winter and Spring quarter. At least two special topic courses (IMM-610) must be taken prior to

graduation. 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 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.

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 Quarter 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 quarter 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 quarter 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 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 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. A sixth-year student would not get an assistantship from the department, although the advisor may continue to provide one from her or his laboratory funds. Students are accepted into the program with the understanding that they will devote their full time to learning and research. As the assistantships are paid at the beginning of every quarter, any student leaving after receiving the assistantship but without completing the quarter will be required to repay the balance in a prorated manner to the department. 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-Harathi, PhD, George Washington University (Professor): 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

Alison Finnegan, PhD, Tufts University (Professor): Regulation of the immune response; Cellular immunology; Autoimmune diseases

Diana D. Huang, PhD, University of Michigan (Assistant Professor): HIV virology; Diagnostic tests for HIV infection

Sau-Ping Kwan, PhD, University of Cincinnati (Professor): Molecular genetics of immune deficiency diseases; Autism disorders

Alan L. Landay, PhD, University of Pittsburgh (Professor and Chair): Immune response to HIV infection; Clinical markers of HIV infection

Thomas F. Lint, PhD, Tulane University (Professor): Mechanisms of complement-mediated cell lysis

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

Carl Ruby, PhD, Oregon State University (Assistant Professor): Cellular and molecular defects in anti-tumor immunity

Carla Scanzello, MD, PhD, Temple University (Assistant Professor): Innate immune mechanisms in the pathology of osteoarthritis

Sasha Shafikhani, PhD, University of California, Berkeley (Assistant Professor): *Pseudomonas aeruginosa* pathogenesis; Host response to infection

Gregory T. Spear, PhD, University of Illinois at Chicago (Professor): Role of the complement system; Innate immunity and antibodies in HIV infection

Larry L. Thomas, PhD, University of Illinois at Chicago (Professor and Graduate Program Director): Role of neutrophils in asthma pathophysiology

David Williams, PhD, University of Illinois (Associate Professor): 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.

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-511, 521, 522, 523, 524, 525, 900 and 580. The courses MPH-601, 602, 603, 608, 621, 622, and 900 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-511, 541, 561, 562, 563, 564, 565, 900 and 580. The courses MPH-608, 621, 622 and 900

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 eight quarters 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, 623A, 623B, 623C, 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 five members, at least three 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 five faculty members approved by the department advisory committee. At least three 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 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 48 quarter hours of required courses, including research, is required for the Master of Science degree with a major in radiological sciences. Of these, a minimum of 14 quarter 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 quarter hours. There is no foreign language requirement. The time limit for completing the program is five years.

Doctor of Philosophy

A minimum of 40 quarter hours of medical physics courses (excluding research) must be completed successfully. A total of 150 quarter hours of academic credit is required for the PhD degree. A maximum of 60 quarter 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

Rush University annually issues a report that summarizes research projects of the entire faculty.

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 predoctoral 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; 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 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, 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 pursue successfully 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 quarters. 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-502 Introductory Membrane Biophysics
PHY-503 Physiology of Striated Muscle
PHY-504 Neurophysiology
PHY-521 Mathematical Methods for Physiologists
PHY-523 Circuit Theory and Practical Design
PHY-531 Physiological Modeling
PHY-532 Physiological Modeling
PHY-590 Special Topics in Physiology
PHY-598 Introduction to Research
PHY-640 Applied Electrophysiology
PHY-641 Molecular Mech in Control of Ion Permeability
PHY-651 Advanced Topics in Muscle Physiology
PHY-653 Problems in Synaptic Physiology
PHY-655 Sensory Neurophysiology
PHY-690 Research Topics 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 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 electrodiffusion. 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, 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, who 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. Vlassiouk, 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 [refs]. 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, 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 as 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 heart beat. 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 we 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, to 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. RyR luminal Ca regulation: Swapping calsequestrin and channel isoforms. *Biophys. J.* 97(7):1961-70, Oct. 7, 2009.

Liu et al. Flux regulation of cardiac RyR channels. *J. Gen. Physiol.* 135 (1): 15-27, 2010.

Ramos-Franco et al. Ryanodol action on calcium sparks in ventricular myocytes. *Pflügers Arch.* 460(4):767-76, 2010.

Porta et al. Single RyR channel basis of caffeine's action on Ca sparks. *Biophys. J.* 100(4):931-938, 2011.

Zhou et al. Carvedilol and its new analogs suppress arrhythmogenic store overload-induced Ca release. *Nature Med.* 17(8):1003-9, 2011.

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 emphasizes 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, behavioral neuroscience, neuroimaging, neuropharmacology, neurochemistry, cell and molecular biology—all of which are important for the understanding of the functions of the 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 quarter 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.

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 minimal residence requirement established by The Graduate College, which is eight quarters of full-time enrollment of at least 12 credit hours per quarter, is followed. 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 quarter 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 certain 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 is used that encourages extensive discussion and student participation. 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 are:

Year 1

Fall Quarter

GCC-501	Molecular Biology: Genome to Proteome	3
GCC-502	Cellular Biochemistry: Proteins, Transport and Signaling	3
GCC-511	Readings in Molecular Biology	1
GCC-512	Readings in Cellular Biology	1
NEU-598	Pre-dissertation Research	2-12

Winter Quarter

GCC-503	Functional Cell Biology	2
GCC-504	Functional Tissue Biology	3
GCC-506	Biomedical Ethics	1
GCC-513	Readings in Functional Cell Biology	1
GCC-514	Readings in Functional Tissue Biology	1
NEU-598	Pre-Dissertation Research	Variable
PHR-504	Introduction to Physiology/ Pharmacology	3

Spring Quarter

GCC-507	Medical Research Strategies	2
GCC-508	Writing Practicum	2
NEU-502	Medical Neurobiology	6
NEU-598	Pre-Dissertation Research	2-12

Summer Quarter

NEU-511	Techniques in Neuroscience	2
NEU-598	Pre-dissertation Research	2-12

Year 2

Fall Quarter

NEU-511	Techniques in Neuroscience	2
NEU-544	Statistics and Experimental Design for Neuroscience	4
NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-Dissertation Research	2-12

Winter Quarter

NEU-511	Techniques in Neuroscience	2
NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-Dissertation Research	2-12

Spring Quarter

NEU-511	Techniques in Neuroscience	2
NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-Dissertation Research	2-12

Summer Quarter

NEU-591	Advanced Neuroscience Proseminar	6
NEU-598	Pre-Dissertation Research	2-12

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 six 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 they fail to remedy their average, they 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 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, neuropsychopharmacology, cell and molecular biology, etc. Research among the faculty is especially strong in the following areas: transplantation and regeneration; the neurobiological bases of normal memory and of its dysfunction; aging; the neurobiological bases of degenerative disorders such as Alzheimer's disease, Parkinson's disease and Huntington's disease; multiple sclerosis; the pathophysiology of epilepsy; and visual physiology and genetics. Thus, depending on interest, numerous interdisciplinary research areas are available to the student.

PhD in Nursing Science: Program Overview

The Doctor of Philosophy (PhD) in Nursing Science graduate is prepared as a clinical researcher. These research skills will be based on the integration of knowledge from biological, behavioral and clinical sciences. Clinical research skills will contribute to the scientific basis of care provided to individuals across the lifespan and in any setting where care is provided. Graduates will also have

leadership skills necessary to serve as senior academicians and to influence health care systems and policy.

Online, but Hands-On

The online PhD program has been developed so that students maintain continuous progress throughout the year. Students benefit from innovative teaching and mentoring strategies, multiple methods of curriculum delivery matched to course objectives and a faculty who is committed to preparing graduates for a career in clinical research and academia. Students will need Internet access for courses. Annual on-site learning intensive visits allow face-to-face interactions with faculty and peers that promote scholarly discourse, debate and synthesis of ideas.

Students matriculate in the fall quarter and come to the Rush campus for their first learning intensive visit. Campus visits are scheduled each summer term thereafter for three consecutive years.

Program of Study

The PhD in Nursing Science Program requires a minimum of 44 semester hours of post-baccalaureate coursework plus the completion of an advanced clinical research practicum (minimum of 10 semester hours) and dissertation (minimum of 20 semester hours). Students in the BSN-PhD program must additionally complete 12 hours of graduate-level bridge coursework prior to registering for PhD-level coursework. Bridge coursework is designed to prepare the focused baccalaureate graduate for a career in clinical research while ensuring that foundational graduate content, substantive science coursework and content related to a clinical phenomenon are integrated.

The curriculum is designed to enhance the quest for knowledge essential for a scholarly research career. It combines core courses in research, theory and role development with cognate and supporting courses in the area of the student's research. Research practicum experiences are individually tailored to the student's area of interest. Under the guidance of the faculty advisor, research practica may be completed within the Rush network or at other approved sites. Students must have completed a minimum of four quarter/three semester hours of graduate statistics prior to the beginning of the fall semester.

The BSN-PhD program is not designed to prepare the graduate for certification and/or licensure as an advanced practice nurse (APN). Additional study would be required for such certification. A terminal graduate degree in nursing meets the Illinois Department of

Professional Regulation requirement to qualify as faculty in a college of nursing in Illinois. Prospective applicants whose primary career goals are to function as advanced practice nurses or are undecided that their primary goal is a career in research are encouraged to explore our other program offerings.

Program Requirements and Commitment to an Area of Inquiry

Before students enter the program, it is important that they identify the research area or clinical population in which they are interested. This will assure a close match between the student's interest and advisor's expertise, and lead to a focused program of study that can be completed in a timely manner.

The applicant must demonstrate commitment to one of the broad areas of inquiry in which the College of Nursing faculty can provide senior mentorship and outstanding research practica experiences. Currently, these areas focus on health promotion/risk reduction interventions across the lifespan, and include such topics as health benefits of breastfeeding premature infants, early childhood mental health promotion, aging and family issues, cardiovascular health and persons with HIV/AIDS. Specific interventions include complementary and alternative medicine approaches, physical activity and technological advances, including telehealth. Outcomes of interest focus on improved mental and physical health as well as a reduction of health care costs. Attention is also given to the conduct of research in a multidisciplinary context and with underserved populations. As these research areas change or expand, prospective students should inquire about the availability of faculty research foci.

Commitment to Full Time Study

It is recommended that the applicant commit to pursuing full-time study to enable timely completion of the program, as well as continuity in the development of his or her research. Completion of the program within three years will be possible for many students. A part-time program of study requires an additional year of study.

Commitment to Pursue Pre-Doctoral Research Support

Although personal assets and financial aid can provide partial support for full-time study, predoctoral training fellowships, as well as research and educational assistantships, are important to almost every student. The program requires the student to work with an advisor to prepare a predoctoral fellowship application that can provide support for tuition and living costs during the second year of

study. Students who do not require this type of assistance will also be expected to develop an application (albeit unsubmitted to a funding agency) because of the positive impact of this experience on the student's writing skills and critical thinking.

Commitment to Develop Scholarly Publication Skills

Faculty members are committed to working closely with students to develop and submit manuscripts for publication throughout the program. It is highly desirable for students to have a minimum of one published manuscript upon graduation. Students will use the European or Manuscript Dissertation Format to further advance their publication experience.

PhD in Nursing Science: Admission Requirements

The deadline for submission of applications is February 1 for a fall semester start date. Students taking courses as a Rush University student-at-large will not be admitted if their Rush GPA is below 3.0. All materials submitted for evaluation are taken into consideration.

Applicants submit an online application to NursingCas at: <https://portal.nursingcas.org/>. The following items must be received by the Division of Nursing by the application deadline:

- A completed graduate application
- Official transcripts from all prior institutions of higher education where the student has attended
- A resume or curriculum vitae that includes work experience; educational, leadership and professional organizational activities; and scholarly activities including publications, presentations, research, honors and awards
- Three letters of recommendation with at least one recommendation from a person with a doctoral degree
- GRE scores
- TOEFL scores, if required

In addition to the basic requirements established by The Graduate College, PhD applicants to the Division of Nursing are evaluated using the following criteria:

- A cumulative GPA of a 3.0 on a 4.0 scale for all undergraduate and graduate courses
- A cumulative GPA of a 3.0 on a 4.0 scale for all nursing courses
- A comprehensive essay delineating a research area of interest, qualifications and readiness for doctoral study
- Graduate Record Examination (GRE); for more information go to <http://www.gre.org>

- Test of English as a Foreign Language (TOEFL) scores for applicants who have not completed four years of high school education in the United States
- Two acceptable interviews with Division of Nursing faculty. These are arranged after a preliminary review of academic credentials and application materials.

The Admissions Committee and Division Director evaluate all applications and make recommendations based on several factors. All prior academic experience, faculty interviews and the letters of recommendation are evaluated for an indication of the applicant's potential for success as a doctoral student and future independent investigator. The applicant's statement describing goals and motivation are examined to determine the compatibility between the applicant's area of study and the availability of an appropriate Division of Nursing faculty mentor. Division of Nursing faculty members will interview applicants before admission to the program. The Admissions Committee reserves the right to require additional materials. Students who do not meet the minimum recommended requirements in all areas may be considered on an individual basis.

PhD in Nursing Science: Curriculum

The PhD in Nursing Science program is designed to develop knowledge through the integration of translational research methods. Core content includes courses in: philosophy of science and theoretical frameworks, biostatistics, research ethics, quantitative and qualitative research design and methods, academic role development, advanced clinical research practicum, cognates and dissertation hours. The PhD student and advisor mutually define an individual program of study that includes relevant coursework focusing on translational science. The doctoral program enables the graduate to have the investigative skills of a clinical researcher and the leadership skills necessary to serve as a senior academician and influence health care systems. Completion of the PhD is expected in no more than eight years.

Theory Courses

NSG-680	Understanding Scientific Paradigms	3
NSG-681	Understanding Theoretical Framework Development	3

Statistics Courses

NSG-522	Applied Epidemiology and Biostatistics for Nursing Practice	3
NSG-684	Intermediate Statistics	3
NSG-685	Multivariate Statistics	3

Research Courses

NSG-686	The Research Process: Quantitative Design and Methods Part I	3
NSG-687	The Research Process: Quantitative Design and Methods Part II	3
NSG-688	The Research Process: Qualitative Design and Methods	3
NSG-691	Advanced Clinical Research Practicum (ACRP)	12

Ethics Courses

NSG-683	Ethical Conduct in Research Settings	3
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Role Courses

NSG-682	Developing Professional Writing Skills	3
NSG-689	Leadership Seminar	3
NSG-690	Grantsmanship	3
NSG-679	Academic Scholarship in Nursing	3

Cognates		8
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Dissertation

NSG-699	Dissertation	20
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Independent Study

NRS-900	Independent Study	Varies
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Minimum Total Semester Hours

- BSN-to-DNP: 61 semester hours without dissertation
- MSN-to-DNP: 53 semester hours without dissertation

Advanced Clinical Research Practicum

The purpose of this preliminary in-depth study of a clinical phenomenon is to develop skills as a clinical scientist. The Advanced Clinical Research Practicum provides an opportunity to acquire in-depth knowledge of a specific area of nursing science as well as to gain experience as an investigator using various research methods, and generating pilot data as a prerequisite to dissertation research. Theory-driven, research-based knowledge and the generation of a viable and relevant research question are the expected outcomes. Students systematically explore a clinical research problem that is of practical and theoretical significance to nursing science and practice.

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Theory-driven, research-based knowledge and the generation of a viable and relevant research question are the expected outcomes. Students systematically explore a clinical research problem that is of practical and theoretical significance to nursing science and practice.

Advanced Clinical Research Practicum Guidelines

Rationale and Expectations

The goal of the Advanced Clinical Research Practicum (ACRP) hours at the PhD level is to develop the student's skills as a clinical nurse scientist. The ACRP experience is designed to support the systematic investigation of clinical phenomena in the student's area of interest. Theoretically driven, research-based, hands-on experiences that have clinical relevance are the expected outcome.

The ACRP experience is viewed as a learning experience in which the student has the opportunity to systematically explore a clinical phenomenon that is of significance to nursing science and practice. This research scholarship experience should become the basis for dissertation study. Time should be spent gaining specialized knowledge and expertise in both traditional and nontraditional settings.

All ACRP courses are individually designed courses of independent study. ACRP scholarship activities and related learning experiences should enable the student to participate in the ACRP defense when a minimum of 10 semester hours (NSG-691) have been completed.

Students shall not enroll in NSG-691 hours until the following courses have been successfully completed: NSG-680, NSG-681, NSG-683, NSG-686, NSG-687 and NSG-688.

At the completion of the NSG-691 hours, the student should be able to:

1. Identify a phenomenon through observation/participation.
2. Synthesize the relevant research and practice literature related to the clinical phenomenon, as reflected in a series of increasingly complex scholarly papers (e.g., written integrative literature reviews; in-depth analysis/synthesis of related issues).
3. Describe and place the phenomenon within the broader health care context and state of the science.
4. Demonstrate an in-depth knowledge of how to study the phenomenon (i.e., design issues).

5. Demonstrate a comprehensive understanding of data collection and analytic methods to answer the potential research questions (e.g., pilot study).

The student's advisor will complete a worksheet that addresses the following issues and to ascertain that the student has successfully addressed the following questions:

1. Is the clinical phenomenon and its significance clearly described by the student?
2. Has the student critically analyzed extant knowledge related to the clinical phenomenon under study?
3. Does the student's work represent a synthesis of knowledge related to this clinical phenomenon? Report would include: the data bases accessed (e.g., CINAHL, PubMed, federal agency publication sites, state publication repositories), key words used, any qualifiers used in the search (i.e., range of years or language), inclusion/exclusion rules used for the search, number of identified publications by data base and the number after duplicates are sorted. If this information is displayed in a table format, it usually takes less than a page. Search histories can usually be recounted in two to three paragraphs at most.
4. Does the student identify gaps in what is known about the phenomenon?
5. Will the student's work potentially contribute to what is known about this phenomenon?
6. Did the clinical work performed by the student inform the ACRP defense (e.g., pilot study)?
7. Does the work presented logically lead to a scholarly dissertation question that the student can now articulate?

Guidelines for the ACRP Committee

The purpose of this committee is to advise the student about the development of the ACRP experience, guide development of the ACRP hours, and serve as the examining body. The following guidelines pertain to the overall process:

1. An outline of the student's objectives and plans for the 10 semester hours of NSG-691 should be submitted to the advisor by the end of (and no later than) the first semester of the ACRP experience. The 10 semester hours of NSG-691 must be completed over a minimum of two semesters.

2. The ACRP committee should be formed by the end of (and no later than) five semester hours of NSG-691. The ACRP Committee Approval Form must be submitted to the Program Director. The chairperson of the committee must have a research doctorate, be a member of the College of Nursing Graduate Faculty and must have previously served on ACRP committees.
3. Committee members should have content or methodological expertise needed by the student in studying the clinical phenomenon. Two of the three committee members should have research doctorates and be members of Division of Nursing faculty. Three is the minimum number of committee members. The third committee member should have a research doctorate and make a substantive contribution, but does not have to be a nurse. (A fourth committee member may be a faculty member gaining clinical committee experience.)

Minimum Hours Required for the PhD Degree

The program of study requires a minimum of 61 semester hours of post-baccalaureate graduate study and the completion of a dissertation. The curriculum is designed to engage the student in the generation of knowledge that will inform the practice of nursing. It combines courses in theory, research design and methods, as well as the highly individualized study of selected clinical populations and/or phenomena, secured both in coursework and the advanced clinical research practicum. The advanced clinical research practicum represents the beginning of independent research and is selected and conducted by the student with guidance from the faculty advisor.

The courses in the accompanying table reflect the requirements for theory, research design and methods, role courses and an individualized advanced clinical research practicum of a selected clinical population or phenomenon. Cognate courses are selectively chosen to provide for advanced knowledge about a clinical population or phenomenon. Completion of required coursework and at least twelve hours of advanced clinical research practicum must occur before students are qualified to engage in a formal candidacy defense. The advanced clinical research practicum leads to the dissertation study.

PhD in Nursing Science: Dissertation Process

Candidacy

Two activities define doctoral candidacy: 1) generation of a scholarly, publishable paper that is reflective of the advanced clinical research

practicum process, and 2) successful oral defense of the advanced clinical research practicum. It is expected that these scholarly activities will reveal the student's theoretical, research and clinical applicability concerning the clinical phenomenon of interest. This knowledge is also foundational to the dissertation proposal.

The portfolio of these two clinical scholarship activities constitutes the comprehensive examination of students and will be evaluated by the student's Advanced Clinical Research Practicum Committee. Members of this committee are selected on the basis of their knowledge of the clinical population and/or phenomenon, theoretical orientation to the problem and methodological expertise. Admission to candidacy is a demonstration of confidence that the student will successfully complete a Doctor of Philosophy.

Dissertation Process

A PhD nursing student must complete a dissertation. This document is developed through faculty-guided independent research projects. The dissertation 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 Dissertation Committee, the role of which is to assure that the dissertation meets the high standards of the Division, the college and the university for originality, contribution to the field and scholarly presentation. The Committee also assures the student is making satisfactory progress toward completion of the degree. Additional policies of the committee are available from Division directors or the Dean's office.

The dissertation will be prepared using a three-manuscript format, with each manuscript presenting different aspects of the candidate's scholarly work. The manuscripts will be supplemented with introductory, theoretical, methodological and discussion/conclusions materials as necessary to create a cohesive body of work that supports the research question. The candidate must be the first author on a minimum of three manuscripts; the first two must be submitted to a peer-reviewed journal prior to the dissertation defense. One manuscript must report the findings of the Advanced Clinical Research Practicum (ACRP) project and one manuscript must report the findings of the dissertation research. To allow students to incorporate committee members' feedback, the manuscript that reports the dissertation findings can be submitted to a journal after the defense.

Students are advised to identify their dissertation committee members in advance of the ACRP defense. Acceptance of the manuscripts for publication is not a requirement for the dissertation

defense. Students are also advised to carefully consider journal selection prior to submitting their manuscripts for publication. Should a manuscript be published, the student must be able to obtain permission to include copy written material in the dissertation.

The final dissertation will conform to the specifications outlined in the "Rush University Guide for Preparation of Dissertations and Master's Theses" (available at <http://www.lib.rush.edu/library/pdf/rushdisguide907.pdf>). The main body of the dissertation will consist of five sections:

1. Introduction: The introduction should include a clear statement of the study's purpose and hypotheses to be tested, or research questions for a qualitative study. It provides background information to justify the study. This section will also include statements about the relationships among the dissertation manuscripts.
2. Manuscript #1
3. Manuscript #2
4. Manuscript #3
5. Discussion: The discussion will summarize and synthesize the findings of the three manuscripts into a synopsis that relates the work to the extant literature, advances clinical and research implications, and discusses the study's strengths and limitations.

Each section will contain a reference list of articles cited in that section. Sections 1 and 5 will be written in APA format. Sections 2 through 4 will be written in the format of the journal in which they were published or will be submitted.

Dissertation Research Committee

During the completion of the student's coursework and research practicum, the student and advisor select a dissertation research committee according to the policies of the College of Nursing and The Graduate College. This committee approves the dissertation proposal and ultimately the dissertation itself. The committee can be constituted at any time prior to the petition for doctoral candidacy. The committee is composed of five members including the student's advisor and one faculty member from another department or College in Rush University, or another institution according to Rush University policy. A majority of the members of the five-member committee must be faculty with full-time appointments at Rush University. The Director of the College of Nursing Graduate Division and the relevant Department Chair may serve as ex-officio members of the committee.

The chair of the committee, who cannot be the student's advisor, will be appointed by the Division Director from among the committee members who are from the student's Division. The Chair presides at all subsequent meetings and arranges 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, which requires the approval of four out of the five members.

Dissertation Proposal and Presentation

On the establishment of candidacy, the student will submit a research proposal to the committee. This proposal will build on an exhaustive review of the literature, a clear statement of the problem and its relevance and a well-developed methodological strategy. The dissertation proposal must be approved by the student's committee and provides the basis for the student's continued research. The dissertation committee must meet at least twice before the student is considered for graduation.

At or near the completion of the dissertation, each student gives a public presentation to the academic community at large, to summarize the knowledge she or he has developed. Students work collaboratively with Division of Nursing staff to post announcements (at least two weeks prior to the presentation) via e-mail and on institutional bulletin boards. This posting includes the title of the dissertation; the student's name; advisor's name; and the location, date and time of the defense. This public presentation precedes the final approval of the dissertation by the Dissertation Committee.

Upon completion of all elements of the investigation 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). After the public one-hour lecture attended by the dissertation committee and faculty of the University, the dissertation committee meets in closed session to approve the dissertation. 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. If, however, 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. Students must complete coursework and successfully defend their dissertation within eight years.

PhD in Nursing Science: Academic Policies

Academic Advisor/Principal Advisor

Based on the student's interests and background, the Graduate College Nursing Division Director formally matches the student with a faculty advisor/mentor who collaboratively works with the student to determine the course schedule and monitors the student's progress in both coursework and research practicum hours. The student's clinical research interests guide the selection of the Advanced Clinical Research Practicum and Dissertation Committees.

Academic Progression

Specific regulations governing the process that results in final awarding of the degree are developed by The Graduate College. Unique Division program requirements and regulations are approved by The Graduate College Council. 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 thesis or 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 the Rush University Catalog within the section devoted to each Divisional program and within program publications. It is considered to be the student's responsibility to remain knowledgeable about these program regulations as they are set forth as they may change from time to time.

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.

PhD in Nursing Science: Terminal Objectives

Graduates of the PhD program will develop the skills of a clinical researcher. These skills will be based on the integration of knowledge from biological, behavioral and clinical sciences. Their clinical research skills will 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. Specific outcomes include the ability to:

- Generate knowledge to improve health outcomes and inform health policy
- Integrate knowledge of diversity (i.e., ethnic, cultural, economic, other) into the design, conduct and relevance of research
- Collaborate with multidisciplinary teams in the design and conduct of research
- Disseminate translational research findings to diverse communities and health care settings
- Use relevant, emerging technology to advance research, education, health outcomes
- Conduct research that is ethical and responsible

Assume faculty role of scholar and scientist within academic, clinical and general health care environments.

PhD in Nursing Science: Graduation Requirements

Divisional graduation requirements require completion of the approved individual program of study. Coursework for the PhD must be the equivalent of at least 53 semester hours of graduate credit in addition to the completed dissertation. PhD students must complete degree requirements within eight years.

Commencement

Commencement is held annually at the end of the spring quarter. Students from the Division of Nursing are permitted to participate in the ceremony if they complete degree requirements in the preceding fall or spring semesters. PhD candidates may participate in commencement ceremonies only when all required signatures have been obtained on the Degree Approval form and the form submitted by the specified deadline. The Office of Students Life contacts eligible students about participation in commencement.

PhD in Nursing Science: Research Activities

Health Benefits and Cost of Human Milk Feedings for Very Low Birthweight Infants

Dr. Paula Meier at Paula_P_Meier@rush.edu

Clinical Trial to Enhance Caregiver Physical Activity

Dr. Carol Farran at Carol_J_Farran@rush.edu

The Promise of Church-based Fatherhood Programs for Increasing Paternal Involvement in African-American Non-resident Fathers

Dr. Wrenetha Julion at Wrenetha_A_Julion@rush.edu

Home Telehealth Monitoring of Elderly Cardiac Patients

Dr. Ruth Kleinpell at Ruth_M_Kleinpell@rush.edu

Longitudinal Studies of Mental and Physical Health and Community Service Use in Caregivers of Persons with Dementia

Dr. Judith J. McCann at Judy_McCann@rush.edu

Health Benefits and Cost of Human Milk Feedings for Very Low Birthweight Infants

Dr. Paula Meier at Paula_Meier@rush.edu

Acupuncture to Manage HIV-Related Inflammation

Dr. Barbara Swanson at Barbara_A_Swanson@rush.edu

Health Promotion with Mid-life Women and Physical Activity Interventions

Dr. JoEllen Wilbur at JoEllen_Wilbur@rush.edu

A Chronic Grief Intervention for Alzheimer's Caregivers

Dr. Olimpia Paun at Olimpia_Paun@rush.edu

Reducing Risk for Children of Mexican Immigrant Mothers: Adapting a Mother-Child Communication Program

Dr. Diane McNaughton at Diane_McNaughton@rush.edu

Effective Communication with Robotic Assistants for the Elderly: Integrating Speech, Vision, and Haptics"

Dr. Mark Foreman at Mark_Forman@rush.edu

The Effect of a Virtual Community on Work-Life, Recruitment, and Retention among Nursing Faculty

Dr. Linnea Carlson-Sabelli at Linnea_Carlson-Sabelli@rush.edu

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 both in 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 quarter 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 their 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, their academic and research performance, and their 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 student's 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 three quarters, there is minimal research as classroom studies are emphasized. During these quarters, both master's and doctoral Graduate College students take the Graduate Core Curriculum (GCC) classes and required pharmacology (PHR) courses. The summer quarter 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

Fall Quarter

GCC-501/511	Molecular Biology and Human Genetics	3/1
GCC-502/512	Cellular Biochemistry: Proteins, Transport and Signaling	3/1
PHR-691	Seminar in Pharmacology	1
GCC 521	Pharmacology/Physiology I	3
BTN-522	Experimental Design	2

Winter Quarter

GCC-503/513	Functional Cell Biology	2/1
GCC-504/514	Functional Tissue Biology	3/1
GCC 522	Pharmacology/Physiology II	3
PHR 599	Research in Pharmacology	1
PHR-691	Seminar in Pharmacology	1

Spring Quarter

GCC-507	Biomedical Statistics	2
GCC-508	Writing Practicum	2
GCC 523	Pharmacology/Physiology III	3
PHR-593	Introduction to Grantsmanship	1
PHR-598	Research in Pharmacology	2
PHR-691	Seminar in Pharmacology	1
GCC-506	Biomedical Ethics	1

Summer Quarter

PHR-598	Research in Pharmacology	12
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Year 2

Fall Quarter

PHR-590	Special Topics in Pharmacology	1
PHR-691	Seminar in Pharmacology	1
PHR-561	Drug Biotransformation and Pharmacogenetics	3
PHR-598	Research in Pharmacology	7

Winter Quarter

PHR-594	Structure, Function and Pharmacology of Cell Receptors	3
PHR-590	Special Topics in Pharmacology	1
PHR-691	Seminar in Pharmacology	1
PHR-598	Research in Pharmacology	7

Spring Quarter

PHR-562	Kinetics/Toxicology Drug Interaction/Poisoning	3
BTN-521	Models of Disease	2
PHR-691	Seminar in Pharmacology	1
PHR-598	Research in Pharmacology	6

GCC courses are Graduate College Courses taken by master's and doctoral students from a variety of different Graduate College programs. These courses provide a basic understanding in the biomedical sciences and acquaint the students with the biomedical literature. PHR-prefixed courses are specific to the Division of Pharmacology.

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	1
PHR-691	Pharmacology Seminar	1
PHR-699	Dissertation Research	7
	Elective*	3

* Electives may be selected from any graduate program at Rush and also may be taken through a consortium with other universities. Approval of mentor is necessary. A total of 12 hours of elective credit is required. Electives may be taken as pass/no-pass or for a letter grade.

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 84 credit hours accumulated in the seven quarters 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 (48 quarter 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 84 credit hours. All MS and PhD students must be enrolled at Rush in the quarter they graduate.

Pharmacology: PhD Option for Rush Medical Students

Students may apply to both the graduate program in the Division of Pharmacology and to Rush Medical College. Application to the graduate program can occur either before or after acceptance/matriculation into Rush Medical College. During the first two years, the student will enroll in Rush Medical College and complete the required curriculum. The student will then take a leave of absence from Rush Medical College and enroll in the Division of Pharmacology graduate program. The student is then engaged in full-time graduate studies in the Division of Pharmacology. When the Student had defended their dissertation and completed all graduate requirements, they are awarded a PhD. The student then re-enters Rush Medical College and continues the clerkship program and must meet all requirements of Rush Medical College for the awarding of a MD.

The student is strongly encouraged to begin a research program with potential mentors during the summer(s) before graduate coursework begins. Because of the overlap with Graduate College and Medical College curriculum, students enter the program in advanced standing and the typical time course is 3 years. Upon enrollment, the student will complete the remaining required coursework and enroll in advanced or elective courses. Ongoing research provides a basis for a dissertation that must be presented and defended as required of all PhD students (see below). The PhD degree will be awarded by The Graduate College upon the successful completion of the graduate training program. Students are subject to the full conditions and requirements of The Graduate College when enrolled in the Division of Pharmacology and of Rush Medical College when enrolled in the Medical College.

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 comprised 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 member 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 quarter. 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 you will be required to have an exit interview and provide us with feedback concerning your experience here 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 committee includes the student's mentor/advisor and one outside faculty member that may be from another Rush department or other institution, according to Rush University policy. Additional faculty may be from the Department of Pharmacology at Rush or from Rush faculty members located at pharmaceutical companies. A majority of the members of the five-member committee must be faculty with full-time appointments at Rush who are members of The Graduate College. The director of the Pharmacology graduate division and the chair of the Pharmacology department may serve as ex officio members of the committee. 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.

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, an Innovation section that includes a discussion of how this proposal departs from the literature and offers a 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 quarter. 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 you will be required to have an exit interview and provide us with feedback concerning your experience here 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 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 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 Waivers and Stipends

All accepted doctoral students receive an assistantship (\$25,500 for the 2012–2013 academic year) and a tuition scholarship. The assistantship and tuition scholarship are renewed each year providing the student is making satisfactory progress towards the degree and is not on academic probation. MS students are enrolled on a full-time basis and pay tuition.

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. 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, we are using laying hens—the only widely available spontaneous model of ovarian cancer. We are 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. Paul Carvey works on the pharmacology of the dopamine system in the brain, with particular interest in Parkinson's disease. Using both in vitro and in vivo models, he is currently looking at the role of the Blood Brain Barrier (BBB) as it relates to the entry of environmental toxins as well its relationship to peripheral immune cell involvement of disease progression.

Dr. Bill Hendey is interested in integrin receptors and how they influence inflammation and angiogenesis. Current work examines the role of angiogenesis in promoting continued inflammation in neurodegenerative diseases.

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)

Dr. Judith Luborsky examines immune responses in ovarian autoimmune disease and ovarian cancer in humans and in an animal model with a focus on early events and early detection. Dr. Luborsky is also Director of the Rush Proteomics Core Research Facility.

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 motivational 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. 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

Courses are listed alphabetically by course prefix (not by discipline).

ANA	Anatomy and Cell Biology	OBG	Obstetrics and Gynecology
BCH	Biochemistry	OCC	Occupational Therapy
BHV	Behavioral Science	PAS	Physician Assistant Studies
BMC	Biomechanics	PED	Pediatrics
BTN	Biotechnology	PHR	Pharmacology
CDS	Communication Disorders and Sciences	PHY	Biophysics/Physiology
CHS	College of Health Sciences Interdisciplinary Courses	PMR	Phys Med and Rehab
CLM	Clinical Lab Management	PRF	Perfusion Technology
CRE	Clinical Research	PSC	Psychology
DRM	Dermatology	PSY	Psychiatry
EMD	Emergency Medicine	PTH	Pathology
FAM	Family Medicine	PVM	Preventive Medicine
GCC	Graduate College Core	RAD	Radiology
HHV	Religion, Health and Human Values	RC	Respiratory Care
HSC	PhD in Health Sciences	REL	Religion, Health and Human Values
HSM	Health Systems Management	RMD	Rush Medical College Multidisciplinary Course
IDS	Interdisciplinary Studies	RMT	Rush Medical College Transition Course
IMM	Immunology	RSA	Research Administration
IS	Imaging Sciences	SBB	Specialist in Blood Bank
MED	Internal Medicine	SUR	Surgery
MIC	Microbiology	VAS	Vascular Ultrasound
MLS	Medical Laboratory Science		
MPH	Medical Physics		
NEU	Neuroscience		
NFA	Nurse First Assistant		
NGT	Nursing Transition Course		
NRS	Nursing Graduate		
NSG	Nursing Graduate		
NTR	Clinical Nutrition		
NUR	Nursing Core Classes		

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)

ANA-511 Graduate Histology

The microscopic anatomy of cells, tissues and organ systems of the human body is studied through laboratories, prerecorded 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 discussion, student presentations and exam components adapted for graduate study. (4)

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)

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)

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. Consult Program Director. (4)

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. (I)

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. Prerequisite: Consult Program Director. (2)

ANA-591 Teaching Assistantship

Provides a directed experience in instruction and presentation techniques. Prerequisite: Consult Program Director (variable)

ANA-599 Master's Thesis Research

Laboratory based research project and preparation of the master's thesis. A letter grade is provided for this course. (variable)

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. (variable)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Clinical Curriculum. (NA)

ANA-791 Surgical Anatomy

ANA 791 Surgical Anatomy Elective is offered to provide the advanced medical student with an opportunity to review gross anatomy with a

focus on clinical application. The course is designed to be an independent learning experience, but does not mean that the student will work without the supervision of the course director. Students pursuing all possible residencies have enrolled in this course. The elective is typically a two-week segment with a possible four-week segment with approval of the course director and the Office of Clinical Curriculum prior to the start of the rotation. Two options exist: Option 1 involves clinical case presentations with relevant clinical anatomy discussions. Each student will provide an illustrated PowerPoint presentation of the history, examinations and clinical findings of the patient and a presentation of the relevant clinical anatomy. Option 2 involves participation in laboratory demonstrations in the MI curriculum. Students electing to teach in the MI curriculum will be expected to attend both lectures and laboratory sessions to demonstrate to the first-year medical students. (NA)

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. It is anticipated that the areas of focus will be of particular interest and benefit to the third- and fourth-year medical students as they prepare to launch into their residency programs in their respective specialty areas. 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. (NA)

ANA-999 Continuous Enrollment

Supervision while student is writing the master's thesis or doctoral dissertation following all required course work. Repeated until thesis/dissertation has been accepted for presentation/defense. (I)

ANA-7EI Basic Sciences 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 describing the student's activities, responsibilities, amount of supervision and the 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. (NA)

BCH-505 Advanced Biochemistry

Continuation of BCH-571 at the graduate level. Special emphasis is given to protein biochemistry, enzymology and molecular biology. (4)

BCH-571 Medical Biochemistry I

Medical Biochemistry for graduate students. Concepts covered include experimental techniques, experimental design, biochemical calculations, buffer calculations, bioenergetics and redox chemistry, proteomics, mass spectrometry, enzyme kinetics, carbohydrate chemistry and metabolism, lipid metabolism, digestion, amino acid metabolism, metabolic interrelationships, micronutrients, cytochromes P450, nucleotide metabolism, biomechanics, inflammation, pain and protein turnover. Essay examinations. (5)

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)

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)

BCH-585 Extramural Research

An eight- to ten-week [usually spring quarter] experience at an industrial research 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. (5)

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)

BCH-598 Biochemistry Master's Research

Biochemistry thesis research for master's students. (variable)

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)

BCH-690 Minicourses

(1)

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)

BCH-699 Biochemistry Doctoral Research

Biochemistry dissertation research for doctoral students. (variable)

BCH-900 Independent Study

(variable)

BHV-751 Sleep Disorders

Diagnosis and treatment of sleep and arousal disorders as recognized by the American Academy of Sleep Medicine. 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. (NA)

BMC-501 Statics and 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)

BMC-502 Strength and Properties of Materials

Axially loaded members, torsion of circular and noncircular members, stress and strain and their relationships including three dimensions,

combined loadings, components with pressure, moment of inertia, symmetrical and unsymmetrical bending. (4)

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)

BMC-504 Journal Club

(1)

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. Prerequisites: BMC-501, BMC-502. (4)

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. Prerequisites: BMC-501, BMC-502. (4)

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. Prerequisites: BMC-511, BMC-501, ANA-503. (4)

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. Prerequisites: BMC-511, BTN-522. (4)

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)

BTN-521 Experimental Models in Disease

This course will study the role of the experimental model 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. (2)

BTN-522 Intro 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)

BTN-523 Tools for Research

Application of computer, digital imaging and other supporting technologies are presented and practiced. (2)

BTN-524 Communication and Laboratory Management

All aspects of seeking and obtaining the career start with employment are covered. Laboratory management is introduced. (2)

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. (3)

BTN-532 Laboratory Techniques II

Cell isolation and cell culture techniques. Experimentation with cell cultures; cell cycle, survival, protein and DNA content determination. (3)

BTN-533 Laboratory Techniques III

Basic and extended molecular biology techniques; DNA and RNA work, cloning and protein expression techniques (3)

BTN-534 Laboratory Techniques IV

Animal husbandry, experimental procedures and techniques. (3)

BTN-535 Laboratory Techniques V

Modern techniques in sample analyses. Protein sample preparation and analysis by HPLC, 2-D electrophoresis, IEF, mass spec. Intro to proteomics. (3)

BTN-536 Laboratory Techniques VI

Histology and immunohistochemistry techniques. (3)

CDS-501 Audiologic Methods for Speech-Language Pathologists

This course introduces methods for basic audiologic assessment of adults and children for use by speech-language pathologists. (1)

CDS-504 Speech Production and 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 lifespan 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. Prerequisite: completion of undergraduate course in speech science. (4)

CDS-505 Clinical Methods in 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. P/N grading. (2)

CDS-506 Clinical Methods in 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. P/N grading. Prerequisite: CDS-505. (2)

CDS-507 Neurological Bases of Speech, Hearing and Language

Central and peripheral nervous system structures that form the neurologic foundation for speech, hearing and language are presented. (4)

CDS-510 Professional Issues in 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; health care reimbursement; risk management and legal issues; and other current professional areas. (2)

CDS-511 Speech-Language Pathology Practicum I

Supervised clinical experience with patients presenting speech, language, voice, fluency and 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. Prerequisite: CDS-505; Corequisite: CDS-506. (variable)

CDS-512 Speech-Language Pathology Practicum II

Supervised clinical experience with patients presenting speech, language, voice, fluency and 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. Prerequisite: CDS-505. (variable)

CDS-513 Speech-Language Pathology Practicum III

Supervised clinical experience with patients presenting speech, language, voice, fluency and 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. Prerequisite: CDS-505. (variable)

CDS-514 Speech-Language Pathology Practicum IV

Supervised clinical experience with patients presenting speech, language, voice, fluency and 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. Prerequisite: CDS-505. (variable)

CDS-521 Language Disorders in Preschool Children

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)

CDS-522 Language Disorders in School-Age Children

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. Prerequisite: CDS-521. (4)

CDS-524 Fluency, Dysfluency and 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. Prerequisites: CDS-504, CDS-507, CDS-521, CDS-567. (2)

CDS-526 Articulation and 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. Prerequisite: completion of undergraduate courses in normal speech and language development and in phonetics. (4)

CDS-528 Current Issues in AAC 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)

CDS-537 Anatomy and Physiology of the 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. Prerequisite: Completion of undergraduate course in speech and hearing anatomy and physiology. (2)

CDS-540 Speech Pathology Management of the Head and Neck Cancer Patient

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. Prerequisite: CDS-537. (2)

CDS-542 Speech Pathology Management of Tracheostomized and 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. Prerequisite: CDS-537. (2)

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 noninstrumental examinations with special emphasis on videofluoroscopic swallow study procedures and analysis. Swallowing

disorders in various populations across the age span are discussed. Prerequisite: CDS-537. (4)

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 multidisciplinary approach to treatment through the craniofacial team. This course includes lectures, discussions, observation in the Rush Craniofacial clinic, class presentations and literature review papers. Prerequisite: CDS-537. (2)

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. Prerequisites: CDS-504, CDS-537. (4)

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)

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. Prerequisites: CDS-504, CDS-507. (4)

CDS-568 Cognition and Communication Disorders

This course examines normal cognition and the effects of aging, dementia, agnosia, injury to the nondominant 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)

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)

CDS-581 Research Methods in Communication 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 evidence-based practice are studied. Consideration is given to both group and single subject research designs. Prerequisite: Completion of a course in statistics. (4)

CDS-589 Advanced Speech Pathology Practicum I

Students are placed at practicum sites at Rush or other facilities for an extended clinical experience. Prerequisites: CDS-511, CDS-512, CDS-513 and CDS-514. (variable)

CDS-590 Advanced Speech Pathology Practicum II

Students are placed at practicum sites at Rush or other facilities for an extended clinical experience. Prerequisite: CDS-589. (variable)

CDS-591 Applied Topics in Communication Disorders and Sciences

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. Repeatable course. P/N grading. (variable)

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. (variable)

CDS-601L Anatomy and Physiology of the Auditory System Laboratory

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)

CDS-601 Anatomy and Physiology of the 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)

CDS-603 Acoustics and 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)

CDS-604 Acoustic Phonetics and 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)

CDS-605 Genetics and Embryology of the Auditory System

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. Prerequisite: CDS-601. (2)

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. Prerequisite: Permission of the instructor. (3)

CDS-609 Clinical Observation in Audiology

Students learn to identify and apply key elements required for 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)

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. Prerequisite: CDS-609. (2)

CDS-612 Clinical Operations and Practice Management

Service delivery models including private practice, clinics, medical centers, nonprofit agencies, industry, government and other setting are introduced. Issues associated with clinical operations and practice management include business plan development, private practice orientation, trends in health care, marketing, cost/benefit ratios, financial and accounting considerations. Personnel issues, conflict management and strategic planning are discussed. (3)

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. Prerequisites: Each course has prerequisites—check with course director for specific prerequisites. (variable)

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. Prerequisites: Each course has prerequisites—check with course director for specific prerequisites. (variable)

CDS-618 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. Prerequisites: Each course has prerequisites—check with course director for specific prerequisites. (variable)

CDS-619 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. Prerequisites: Each course has prerequisites—check with course director for specific prerequisites. (variable)

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. Prerequisites: CDS-603, CDS-628. (3)

CDS-627 Pathophysiology of the Auditory System

Students discuss risk factor, symptoms and pathogenesis of various ear diseases and auditory system disorders. Audiologic assessments as well as medical/surgical treatments are explained. Students will also be introduced to concepts related to the origins of tinnitus, clinical assessment and treatment efficacy. Prerequisites: CDS-601, CDS-628. (3)

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-529 Clinical Methods in Audiology. Prerequisite: CDS-601. (4)

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. Prerequisites: CDS-609, CDS-628. (2)

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)

CDS-632 Adult Amplification

This course expands upon basic hearing instruments 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. Prerequisite: CDS-631. (5)

CDS-633 Adult and Geriatric Rehabilitative Audiology

Examination of adult audiologic rehabilitation. Visual, auditory and bi-sensory stimuli in communication are considered along with assessment of communicative function, auditory training, speech reading, 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)

CDS-634 Pediatric Amplification and 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. Prerequisites: CDS-631, CDS-636, CDS-644. (2)

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. Prerequisites: CDS-604, CDS-628, CDS-631. (3)

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. Prerequisites: CDS-628, CDS-644. (3)

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. Prerequisites: CDS-601, CDS-628. (2)

CDS-643 Electrophysiologic Assessment of the Auditory System

This course introduces principles/practices of electrophysiologic methods in audiology assessment. Special emphasis is on the auditory brainstem response and its use with both pediatric and adult patients. The course includes basic information on electrocochleography and otoacoustic emissions. Lab assignments are included. Prerequisites: CDS-601, CDS-628. (4)

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 audiology evaluation of children. Issues related to audiology intervention, multiculturalism, team approaches to case management and family counseling are also presented. Prerequisite: CDS-628. (3)

CDS-646L Vestibular Assessment and Rehabilitation Laboratory

Students develop basic skills in the practical application of ENG/VNG and vestibular rehabilitation. Prerequisites: CDS-601, CDS-601L; Corequisite: CDS-646. (1)

CDS-646 Vestibular Assessment and 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. Prerequisites: CDS-601, CDS-601L. (4)

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)

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)

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. (2)

CDS-661 Amplification Seminar

This seminar focuses on current, innovative, evidence-based fitting and rehabilitation issues related to personal amplification systems. Prerequisites: CDS-631, CDS-632. (1)

CDS-676 Vestibular Assessment and 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)

CDS-680 Investigative Project Planning 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)

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)

CDS-816 Internship I

CDS-816, CDS-817, CDS-818, CDS-819 and CDS-820 is a five-quarter course 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 consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds. (4)

CDS-817 Internship II

CDS-816, CDS-817, CDS-818, CDS-819 and CDS-820 is a five-quarter course 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 consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds. (4)

CDS-818 Internship III

CDS-816, CDS-817, CDS-818, CDS-819 and CDS-820 is a five-quarter course 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 consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds. (4)

CDS-819 Internship IV

CDS-816, CDS-817, CDS-818, CDS-819 and CDS-820 is a five-quarter course 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 consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds. (5)

CDS-820 Internship V

CDS-816, CDS-817, CDS-818, CDS-819 and CDS-820 is a five-quarter course 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 consistent with their clinical progress. The internship experience includes patients across the lifespan and from diverse cultural backgrounds. (5)

CDS-891 Externship I

The CDS-891, CDS-892, CDS-893 and CDS-894 series 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)

CDS-892 Externship II

The CDS-891, CDS-892, CDS-893 and CDS-894 series 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)

CDS-893 Externship III

The CDS-891, CDS-892, CDS-893 and CDS-894 series 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)

CDS-894 Externship IV

The CDS-891, CDS-892, CDS-893 and CDS-894 series 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)

CDS-900 Independent Study

Students pursue an area of their choosing under the direction of a faculty member. Prerequisites: Variable. (variable)

CHS-501 Applied Statistics

This course will concentrate on concepts and procedures for descriptive and inferential statistics for continuous and discrete data and data analysis using parametric and nonparametric statistical procedures. The course is designed to develop the student's knowledge in the use and application of statistics in the practice of research administration. Descriptive statistics, normality, probability

and nonprobability sampling, parametric and nonparametric hypothesis testing and simple and multilinear regression will be presented. Data collection strategies and data management techniques will also be taught. Prerequisite: Admission to the program. (3)

CHS-502 Research Design and Methods

This course provides an introduction to basic, clinical and translational research. The coursework will include an introduction to methods of scientific research including review of literature, research design, sampling techniques, measurement and related subject matter. Students will be exposed to how researchers design a methodical approach to explore a research hypothesis. Prerequisite: Admission to the program. (variable)

CHS-503 Research and 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 the problem, review of the literature, research design, data analysis and results reporting. This course will be taught as an online course. (5)

CHS-510 Health Care in America: An Overview for Health Professions for Students

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. Prerequisite: Admission to the program. (2)

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 lifespan are discussed. Prototype diseases are used to illustrate pathologic concepts. (2)

CLM-558 Marketing and Negotiations

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. Prerequisite: Departmental permission. (variable)

CLM-559 Issues in Pathology

Work-flow analysis and clinical experience in an anatomical pathology laboratory. This will include anatomical pathology, cytology and histology. Management issues unique to these areas will be discussed and studies. Management and supervision issues unique to these areas will be examined. Prerequisite: Departmental permission. (4)

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)

CLM-590 Principles of Laboratory Management

The rapidly changing laboratory environment is constantly responding to diverging trends in health care. 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. (3)

CLM-591 Evidence-Based Research and 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)

CLM-592 Ethics

Course examines the ethical issues in the contexts of clinical laboratory science and the practice of management. Course provides solutions to ethical challenges that arise in the daily activities of the clinical laboratory. 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 online discussions will include topics of lab testing, quality control, risk management, recordkeeping, corporate compliance, research, inspections, employees and education. (2)

CLM-593 Scientific and 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. (4)

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)

CLM-594 Health Care Finance

This course is designed to provide students with a strong foundation 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 general financial topics including financial accounting, budgets, capital equipment acquisition, billing and collection, reimbursement issues, contract negotiations and materials management. This course employs a web-based learning approach for students to gather information through book chapters, Power Point presentations, and additional readings and internet resources. Knowledge will be demonstrated through online discussions, homework assignments, and online examinations. (4)

CLM-595 Method Comparison and Process Validation

This course is designed to prepare laboratory professionals to protect the public health by learning the techniques of validating laboratory methods and processes. Federal government CLIA regulations (Clinical Laboratory Improvement Act) and CAP (College of American Pathologists) will be covered. Quality Assurance (QA) rules and ways of managing QA will be discussed. The course will focus on Methodology Validation: Determination of Accuracy in terms of verification of accuracy, reportable range and evaluation of linearity. Determination of Precision and Reference Range in terms of establishing or verifying a reference interval will be presented. Determination of Analytic Sensitivity, Method Comparison and Medical Decision Points will be explained. (4)

CLM-596 Quality Systems and 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 (QSEs) and be able to implement a quality management system (QMS). This course is designed to provide a web-based learning approach to teaching laboratory regulations and the principles of quality management. (4)

CLM-597 Issues and Practices in Human Resource 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 nonunion) and health and safety. (4)

CLM-598 Health Care Informatics

This course will include an overview of health care 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. (3)

CLM-599A Masters 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)

CLM-599B Masters Project II (Management)

This course is the continuation of the Masters Project I and Practicum. This second course involves submitting a proposal for a management project. The goal of completing a management project is to prepare the students to become informed users of management literature and related research. Students will conduct management projects in areas of specialization chosen by the student or in an area of general laboratory administration and practice. 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 student will choose a targeted journal and follow the guidelines in preparing their proposal established by the department. The practicum part of

the course continues to provide students with experiences related to laboratory administration policy, procedures and operations. (2)

CLM-599C Masters Project III (Management)

This course is the continuation of the Masters Project II and Practicum. This third course involves writing the final paper, which should be of publishable quality, for submission to the department and a management journal chosen by the student. The practicum part of the course continues to provide students with experiences related to laboratory administration policy, procedures and operations. Students are required to complete a management dossier. The dossier will include written documentation of participation in management activities. It is suggested that the student keep a daily journal to document activities for fulfillment of the management practicum. (2)

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 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. (2)

CRE-557 Clinical Trials I (Intro to Clinical Research)

Presents an overview of clinical trial design, including large simple trials, randomized double-blind trials, crossover trials, parallel studies, enrichment studies, as well as other designs. Topics covered include formulation of the Research Question, measurement of outcomes, studies in special populations, determining sample size, techniques of randomization and blinding, subject recruitment, observational studies and different types of small randomized studies. The course addresses how studies are designed to answer specific research questions. (3)

CRE-558 Clinical Trials II (Intro to Clinical Research)

This course is a continuation of Clinical Trials I, covering genetic data and the era of personalized medicine, assessing and reporting of adverse events, assessment of quality of life, the function of Data and Safety Monitoring Board, techniques involved in the study closeout, methods of reporting and interpreting clinical trials, economic analysis in clinical trials and the emerging field of comparative effectiveness research. The course also focuses on protocol applications of clinical trials design and data interpretation. Prerequisite: CRE-557. (3)

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. (2)

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. (5)

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, natural course and treatment. Clinical and histopathologic correlations are emphasized. Therapeutics stress underlying pathophysiology of disease. There is a written final examination based on assigned reading. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

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. (NA)

EMD-717 Disaster Medicine

All activities will be conducted online through the use of web-based study modules and discussion forums. 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). 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. There are daily questions to be individually completed and two weekly group projects (all students collaborate on one answer) to be completed in the forums. 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. For additional information, please visit <http://www.DMc clerkship.org/>. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

EMD-822 Pediatric Emergency Medicine

Five eight-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. (NA)

EMD-830 Medical Toxicology/Poison Control

The Toxicology elective will introduce the student to the nature and scope of poisoning. The Illinois Poison Center (IPC) receives all calls regarding poisonings in the entire state of Illinois and handles 90,000 to 100,000 calls per year from individuals and health care facilities. The goal for the medical student on the toxicology elective is to develop a basic understanding of acute poisonings. The student will become knowledgeable about the role of the IPC and medical toxicologists in public health, in managing poisoned patients and the interface with the public and health care facilities. Morning activities will be with the Toxikon Consortium: Mondays, Journal Club/Didactic Teaching Rounds; Tuesday, Didactic Teaching Rounds; Wednesday, Fellow Conference, student and resident presentations; Thursday, Didactic Teaching Rounds and lectures; Friday, Didactic Teaching Rounds, student and resident presentations. The student will spend one week of afternoons or evenings at the Illinois Poison Center, participating in Poison Center calls and educational activities delivered by the Illinois Poison Center staff. (NA)

FAM-701 Family Medicine Core Clerkship

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. (NA)

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. (NA)

FAM-725 Alcoholism/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. (NA)

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. Depending on students' interest and the availability of the attendings, this course may be taken either at Midwest Orthopedics at Rush (1725 W. Harrison) or at Midwest Orthopedic Consultants, Inc., in Orland Park. Students must make arrangements for this clerkship with Dr. Cynthia Waickus. Credit for this course will apply toward the eight weeks' maximum credit in the orthopedics subspecialty. (NA)

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. (NA)

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. (NA)

FAM-761 Principles/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. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

FAM-7E1 Family Medicine 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. (NA)

GCC-501 Molecular Biology: Genome to 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)

GCC-502 Cellular Biochemistry: Proteins, Transport and 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. (3)

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)

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)

GCC-505 Techniques in Biomedical Sciences

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, histocytochemistry and microscopy. (2)

GCC-506 Research 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 nondiscrimination, abusive relationships, student-faculty relationships, responsibilities of students, faculty, chairpersons and administrators, honesty in writing, authorship and ownership of data. (1)

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)

GCC-508 Writing Practicum

This is a hands-on writing course that 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 subcomponents. (2)

GCC-511 Readings in Molecular Biology

Journal Club course that covers topics related to GCC-501. (1)

GCC-512 Readings in Cellular Biochemistry

Journal Club course that covers topics related to GCC-502. (1)

GCC-513 Readings in Functional Cell Biology

Journal Club course that covers topics related to GCC-503. (1)

GCC-514 Readings in Functional Tissue Biology

Journal Club course that covers topics related to GCC-504. (1)

GCC-520 Introduction to Physiology and Pharmacology I

The GCC-520, -521 and -522 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, winter and spring. (3)

GCC-521 Introduction to Physiology and Pharmacology II

The GCC-520, -521 and -522 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, winter and spring. (3)

GCC-522 Introduction to Physiology and Pharmacology III

The GCC-520, -521 and -522 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, winter and spring. (3)

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)

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)

GCC-548 Bioinformatics

This course presents introductory material on methods and procedure of bio-informatics and how it may be helpful in undertaking clinical trials. (1)

GCC-551 Ethics in Biomedical Research and the IRB

This course covers the role of the institutional Review Board in Clinical Research. The course includes didactic lectures on the requirements of informed consent, regulatory processes, intellectual property, the role of the office of research integrity as well as a required participation on IRB review panels at the University. (2)

GCC-552 Introduction to the Regulatory Process: Drug Discovery and Development

Lecture covers 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. (3)

GCC-593 Introduction to Grantsmanship

This course is designed to provide the practical aspects of a grant proposal submission. In addition to covering basic writing skills, the course 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. (2)

GCC-620 Introduction to Teaching

This course builds crucial educational skills that PhD graduates will need to function as teachers in academia. Designed as a mentored experience for PhD 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 three to four quarters, students will enroll in one to three credit hours based on prior teaching experiences and recommendations from the Course Director and from their advisors. All quarters, P/N grading. (variable)

HHV-504 Ethics in Health Care

This 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, online content, case analysis and discussion. This is an interdisciplinary course taken by students in the College of Health Sciences. (2)

HHV-711 Medical Ethics

Collaborating with at least one clinical 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, shadow an ethics consultation or be involved in other activities that advance their inquiry. FA WI SP SU (times may have to be negotiated). (NA)

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)

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)

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)

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)

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)

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)

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)

HSC-613 Statistics II

This course will be a continuation of HSC-612. Hypothesis testing techniques, which involve observation and analysis of more than one statistical variable at a time, will be discussed. Examples include ANOVA, ANCOVA, MANOVA, MANCOVA, , T-tests and regression models. (4)

HSC-614 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. (3)

HSC-615 Research Seminar 1

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)

HSC-616 Research Seminar 2

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)

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. This is a pass/no pass course. Repeated until dissertation has been successfully defended. Prerequisite: Permission of program director. (variable)

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)

HSC-621 Issues 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)

HSC-622 Research Settings

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. (1)

HSC-623 Management and Supervision

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)

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)

HSM-504A Professional Seminar I

The purpose of this course is to review basic professional principles and develop data management skills. In this course, professionalism in terms of time management and written and verbal communication including email and executive memo etiquette is reinforced 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 (ie, 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 internship and job responsibilities. (2)

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)

HSM-505 Introduction to Clinical Concepts and Patient Care

The course provides an introduction to clinical terminology and how patient care happens in the health care 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 through in class presentations and site visits. Clinical terminology is reviewed by body system so that students are familiar with these terms as they enter the health care field. (2)

HSM-514 Statistics for Health Care Management

This course emphasizes intermediate statistical principles that health care managers use for achieving optimal organizational performance, pursuing organizational transformation and conducting research. Topics include descriptive statistics, normality, probability and nonprobability sampling, parametric and nonparametric hypothesis testing and regression. Statistical software packages including SPSS, Excel and R are reviewed and utilized. Prerequisite: Undergraduate statistics. (4)

HSM-515 Human Resource 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)

HSM-523 Managerial Epidemiology

This course emphasizes managerial epidemiologic principles that health care 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)

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)

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, eg, 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. 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. Prerequisite: HSM-531, HSM-536. (3)

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. (4)

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)

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 health care 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)

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 multiple self-assessments, motivation, values and ethics, managing people, performance management, organizational culture, organizational design, interpersonal communication, managing diversity, group dynamics and work teams, problem-solving, conflict and negotiation 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)

HSM-549A HSM Part-Time (PT) Internship

The standard HSM Internship requires real-world work experience in a health care organization. HSM part-time (PT) students are almost always full-time working professionals in a health care organization. For PT students with full-time work experience in a health care organization, the internship experience should require the PT 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 PT students who work full-time to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with PT students early in their studies to plan an approach that meets the characteristics of an "ideal" Rush Internship and emphasizes the IO "distinguishing competencies" plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected. (3)

HSM-549B HSM Part-Time (PT) Internship

The standard HSM Internship requires real-world work experience in a health care organization. HSM part-time (PT) students are almost always full-time working professionals in a health care organization. For PT students with full-time work experience in a health care organization, the internship experience should require the PT 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 PT students who work full-time to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with PT students early in their studies to plan an approach that meets the characteristics of an "ideal" Rush Internship and emphasizes the IO "distinguishing competencies" plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected. (3)

HSM-549C HSM Part-Time (PT) Internship

The standard HSM Internship requires real-world work experience in a health care organization. HSM part-time (PT) students are almost always full-time working professionals in a health care organization. For PT students with full-time work experience in a health care organization, the internship experience should require the PT 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 PT students who work full-time to complete the HSM Internship degree requirement; the student's academic adviser who is also this course director work with PT students early in their studies to plan an approach that meets the characteristics of

an “ideal” Rush Internship and emphasizes the IO “distinguishing competencies” plus the Professionalism competency. Demonstration of the Rush ICARE values is also expected. (3)

HSM-550A HSM Internship

The HSM internship requires a minimum of 440 hours of real-world work experience in a health care organization. HSM full-time 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, full-time students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. The internship emphasizes the IO distinguishing competencies contained within the full set of 26 competencies for the National Center for Health Care 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. (3)

HSM-550B HSM Internship

The HSM internship requires a minimum of 440 hours of real-world work experience in a health care organization. HSM full-time 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, full-time students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. The internship emphasizes the IO distinguishing competencies contained within the full set of 26 competencies for the National Center for Health Care 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. (3)

HSM-550C HSM Internship

The HSM internship requires a minimum of 440 hours of real-world work experience in a health care organization. HSM full-time 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, full-time students do have the option of fulfilling the requirement through a more traditional summer internship that they identify and secure. The internship emphasizes the IO distinguishing competencies contained within the full set of 26 competencies for the National Center for Health Care 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. (3)

HSM-551 Health Informatics

This class provides students with an introduction to Health Informatics, a field concerned with the use of information technology in health care. 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. Prerequisite: HSM-552. (2)

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)

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. Prerequisite: HSM-502. (3)

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 health care organization's strategic planning and marketing initiatives. Prerequisites: HSM-502, HSM-523, or concurrently. (4)

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)

HSM-567 Health Insurance and 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-531. (3)

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 nontechnical terms. The course uses a combination of learning methods, including group discussion, multimedia, 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. Prerequisites: HSM-514 or concurrent and HSM-551 or concurrent. (4)

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)

HSM-590 Topics in Health Systems Management (elective)

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)

HSM-593 Governance, Interprofessionalism and Leadership

This course is designed to increase students' knowledge and competencies in the interrelated areas of leadership, interprofessionalism 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 multisource feedback and reflective learning exercises. Students will learn competencies associated with developing and

maintaining effective interprofessional relationships through interactive discussions with health care 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 health care industry. Prerequisites: HSM-502, HSM-515, HSM-545. (4)

HSM-596 HSM Capstone: Strategic Management of 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)

HSM-597A Masters Project I

The overall goal of the Master's Project I and II 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, -504 A-B, -514, -523 or concurrently, -533, -551, -552, -557 and -572. (4)

HSM-597B Master's Project II

The overall goal of the Master's Project I and II 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, -504 A-B, -514, -523 or concurrently, -533, -551, -552, -557 and -572. (4)

HSM-597C Master's 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. Prerequisites: HSM-597A and HSM-597B. (2)

HSM-900 Independent Study

Specialized course work designed around the needs of an individual student. (variable)

IDS-505 Interdisciplinary Studies in Palliative Care

This interdisciplinary course consists of web-based learning modules focused on critical aspects of palliative care. Students will explore palliative care as an interdisciplinary approach to care for people with chronic, life-limiting illness across the lifespan and health-illness continuum through didactic content with online discussion, clinical observation and case study/simulation experience. It is expected that students will devote 30 to 40 hours over the two-week course. Students will be required to: 1) Complete six self-paced, web-based learning modules and online discussion, and 2) attend two day-long palliative care clinical experiences including simulation/case study activities. The time requirements of the course; therefore, allow flexibility of direct clinic and classroom contact; 60% of the course is

on line (asynchronous and interactive). REGISTRATION MUST BE COMPLETED BOTH through the Medical College (enroll via Oasis) AND through Rush University Registrar's Office (complete the RU Connected process on line or turn in required form from <http://www.rushu.rush.edu/pdffiles/add-drop.pdf> to Carmen Ramirez, Registrar's Office, 4th Flr, AAC). Please follow all instructions, processes and deadlines. Contact , Marcia_Phillips@rush.edu, Masako_Mayahara@rush.edu, Carmen_M_Ramirez@rush.edu, or Jan_L_Schmidt@rush.edu with questions. (2)

IDS-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. Prerequisite: Admission to the Department. (2)

IDS-515 Geriatric Interdisciplinary Team Training

Principles of interdisciplinary team care are applied to the management of complex, geriatric patients in a variety of settings. Guest faculty from medicine, nursing, social work and health sciences lead case study discussions. Permission of instructor. FA WI SP SU. P/NP only. (variable)

IMM-505 Immunology

Introduction to immunology with emphasis on basic concepts and principles and on clinical consequences of deficient altered immune responses. Medical students only. (1)

IMM-507 Basic Immunology I

Introduction to immunology, with emphasis placed on the components, nature and organization of the immune system. (1)

IMM-508 Basic Immunology II

A continuation of Basic Immunology I. This course focuses on activation and regulation of the immune response. (1)

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)

IMM-515 Research Seminar

Seminar on contemporary topics in immunology and virology. (1)

IMM-520 Advanced Readings in Immunology 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. (1)

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. (variable)

IMM-600 Laboratory Rotations

Individual program, acquaints the student with research protocols and interests within the department. (variable)

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. (variable)

IMM-615 Pre-Dissertation Research

Research credits prior to acceptance to doctoral candidacy. (variable)

IMM-620 Dissertation Research

Research credits after admission to candidacy. (variable)

IMM-900 Independent Study

Specialized course work designed around the needs of an individual student. (variable)

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. Prerequisite: Admission to the Department. (5)

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)

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)

IS-324 Pharmacology

A study of pharmacodynamics, pharmacokinetics, medication administration, drug categories and implications in patient care. Emphasizes pharmaceuticals frequently used in medical imaging. Prerequisite: Admission to the Department. (4)

IS-332 Management

(Equivalent to SAHP-431) 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. Credit at the graduate-level requires completion of a course project. Prerequisite: Admission to the Department. (5)

IS-334 Computed Tomography Positioning and Protocols

(Equivalent to RSTE-426R) 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)

IS-335 Advanced Radiation Biology

(Equivalent to RSTE-438N) 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)

IS-336 Introduction to MRI

(Equivalent to RSTE-419R) This is 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 three 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)

IS-440 Cultural Competence and Communication

(Equivalent to SAHP-415) 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 health care 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 health care. The course will include an in-depth assessment of the CLAS standards and cultural competency information available to health care organizations. (3)

IS-441 CT Physics

(Equivalent to RSTE-428R) 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)

IS-442 Radiologic Contrast Agents

(Equivalent to RSTE-413R) 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)

IS-443 MRI Positioning and Protocols I

(Equivalent to RSTE-425R) 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 and 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)

IS-445P Clinical Practicum I

Supervised clinical experience in the imaging track selected. Prerequisite: IS-441, IS-442, IS-443 or IS-444. (5)

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. Prerequisite: Senior status. (3)

IS-450 MRI Physics

(Equivalent to RSTE-420R). 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)

IS-451 Sectional Anatomy and Pathology I (CT/MRI)

(Equivalent to RSTE-410R) 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: RSTE Advisor approval. (6)

IS-455P Clinical Practicum II

Supervised clinical experience at the intermediate level in the imaging track selected Prerequisite: IS-445. (3)

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. Prerequisite: IS-446. (3)

IS-461 Sectional Anatomy and Pathology II (CT/MRI)

(Equivalent to RSTE-411R) This is a continuation of Sectional Anatomy, Pathology and Physiology as it relates to CT/MRI imaging. Prerequisite: RSTE-410R. (6)

IS-465P Clinical Practicum III

Supervised clinical experience at the advanced level in the imaging track selected. Prerequisite: IS-455. (5)

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. Prerequisite: IS-456. (3)

IS-471P Clinical Practicum IV

Supervised clinical experience at the leadership level in the imaging track selected. Prerequisite: IS-465. (5)

IS-473 MRI Positioning and Protocols II

(Equivalent to RSTE-427R) This course is a continuation of RSTE-425R 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: RSTE-425R. (3)

MED-703 Medicine Core Clerkship

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. (NA)

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-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. (NA)

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. (NA)

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. (NA)

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 or her individual interest. The research program of the Section of Cardiology encompasses treatment and prevention of chronic heart failure, arrhythmias and coronary artery disease; special interests include echocardiography, coronary intervention and cardiac pharmacology. 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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

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. (NA)

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 subintern 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 signout 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 will 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. (NA)

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. (NA)

MED-732 Digestive Diseases

The four-week rotation in Digestive Diseases is divided into two 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, 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. (NA)

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 (multiheaded) 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 are available to the students on an optional basis. (NA)

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 eight weeks prior to the start. (NA)

MED-747 Global and Community Medicine

For the Global and Community Health elective, students spend between two and four 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 two to four 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 online curriculum and reading self study prerequisites prior to departure for their work in the community and must submit a completed project within one week of the completion of the elective. (NA)

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. (NA)

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. (NA)

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, X-ray interpretation and the provision of mechanical ventilatory support are emphasized during the rotation. (NA)

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. NOTE: Enrollment is limited to M4s. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

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 as well as 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 in a variety of settings, which may include clinic, inpatient consults, inpatient palliative care and long-term care. The curriculum includes exposure to topics in core geriatric practice (geriatric syndromes, the application of the physiology of aging to the bedside, estimating life expectancy, etc.), medical ethics, medical economics and medical and legal aspects of end-of-life care. Weekly didactic sessions presented by section faculty complement clinical experiences. (NA)

MED-799 Combined 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. (NA)

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. (NA)

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 to 15 per week in the outpatient clinic; and 2 to 3 patients per 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. NOTE: Preference is given to M4 students. This elective may also be taken for four weeks. Please contact Jan Schmidt in the Office of Medical Student Programs for more information (jan_l_schmidt@rush.edu). (NA)

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. (NA)

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. (NA)

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. (NA)

MED-832 Digestive Diseases

During a four-week rotation, a thorough review of major gastrointestinal and hepatobiliary disorder topics will be provided by several education and interactive conferences. The student will have a golden opportunity to see a variety of GI endoscopic findings, including several extraordinary cases. The student will learn the approach and management of GI disorders as well as interpretation of laboratory tests and procedures. (NA)

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 (multiheaded) 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 are available to the students on an optional basis. (NA)

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 multidisciplinary team rounds that include an Infectious Disease attending, Medicine house staff, clinical pharmacist and physician assistants (PAs). 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. (NA)

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 a 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 two-hour clinical conference at Rush. (NA)

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 ECGs are also reviewed with the attending staff. Students will be exposed to the presentation and management of patients with chest pains, acute coronary syndromes and congestive heart failure as well as various arrhythmias. All patient orders will be supervised and cosigned by the house staff. Students will usually see two patients daily and follow their patients for the approximate 48-hour stay while they are on the observation unit. Students will be based on the telemetry units from Mon. to Fri. between the hours of 8 a.m. to 6 p.m. (NA)

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. (NA)

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. (NA)

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, subacute 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; and 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 or 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. The subgroups of students for whom this clerkship is especially appropriate/recommended include students planning a career in primary care, emergency medicine or any branch of internal medicine. (NA)

MED-7EI Medicine Individualized Elective

Students may receive credit for individually arranged activities with Rush faculty members; outside faculty; personal, private physicians or researchers; or persons in a 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. (NA)

MIC-501 Microbiology Concepts I

An introduction to the morphological and physiological characteristics of infectious agents of importance in human disease. (2)

MIC-502 Microbiology Concepts II

Continuation of MIC-451. (1)

MLS-477 Clinical Specialty Practicum

Note: Graduate students will register for the Master's Project in place of the 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. Prerequisite: Departmental permission. (variable)

MLS-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. Prerequisite: Departmental permission. (variable)

MLS-558 Marketing and Negotiations

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. Prerequisite: Departmental permission. (variable)

MLS-559 Issues in Pathology

Workflow analysis and clinical experience in an anatomical pathology laboratory. This will include anatomical pathology, cytology and histology. Management issues unique to these areas will be discussed and studies. Management and supervision issues unique to these areas will be examined. Prerequisite: Departmental permission. (variable)

MLS-563 Master's Project I

The 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. Prerequisite: Departmental permission. (variable)

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: Departmental permission. (variable)

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. (variable)

MLS-900 Independent Study

Requires departmental permission. Prerequisite: Departmental permission. (variable)

MLS-300/500 Laboratory Fundamentals

Comprehensive instruction in laboratory mathematics, laboratory techniques and safety. Medical terminology included as an online component. Prerequisite: Departmental permission. (2)

MLS-301/501 Clinical Chemistry I

Biochemistry, analysis and application of clinically significant chemical substances. Theory, maintenance and operation of basic equipment such as pipetting 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)

MLS-302/502 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. Prerequisite: Departmental permission. (3)

MLS-303/503 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. Prerequisite: Departmental permission. (3)

MLS-306/506 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. Prerequisite: Departmental permission. (variable)

MLS-307/507 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. (variable)

MLS-308/508 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, nonprotein nitrogens, hemoglobin degradation products, electrolytes, pH and blood gases. Includes correlation of data for selected disease states. Prerequisite: Departmental permission. (variable)

MLS-309/509 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, including 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. Prerequisite: Departmental permission. (variable)

MLS-310/510 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. Prerequisite: Departmental permission. (5)

MLS-311/511 Hematology II

This course is designed to introduce basic concepts in coagulation and hemostasis. Topics include: Megakaryopoiesis, hemostasis and coagulation; and description and definitions of various coagulopathies of known and unknown etiologies. Prerequisite: Departmental permission. (2)

MLS-312/512 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. Prerequisite: Departmental permission. (4)

MLS-317/517 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. Prerequisite: Departmental permission. (variable)

MLS-319/519 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. Prerequisite: Departmental permission. (variable)

MLS-320/520 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)

MLS-321/521 Clinical Immunology I

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)

MLS-330/530 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. Prerequisite: Departmental permission. (5)

MLS-331/531 Parasitology, Mycology and 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. Prerequisite: Departmental permission. (4)

MLS-338/538 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 clinical activities designed to 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. Prerequisite: Departmental permission. (variable)

MLS-339/539 Advanced Parasitology, Mycology and 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. Prerequisite: Departmental permission. (variable)

MLS-344/544 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. Prerequisite: Departmental permission. (variable)

MLS-345/545 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. Corequisite: GCC-506 Biomedical Research Ethics; Prerequisite: Departmental permission. (variable)

MLS-346/546 Professional Development III

Students participate in professional enrichment projects. These projects are divided up into five areas that 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. (variable)

MLS-366/466/566 Special Topics: Case Studies

The student will analyze prepared case studies in areas of special interest and answer questions regarding the case in the form of homework assignments, class discussions and by composing their own case studies with information from the literature, textbooks and the Internet. Prerequisite: Departmental permission. (variable)

MLS-368/468/568 Special Topics in Clinical Laboratory Sciences

An examination of contemporary professional issues in clinical laboratory sciences. Content varies according to topics chosen by instructor. Prerequisite: Departmental permission. (variable)

MLS-413/513 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: MLS-311/511. (2)

MLS-422/522 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. Prerequisites: MLS-330/530, MLS-331/531. (2)

MLS-432/532 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. Prerequisite: MLS-321/521. (2)

MLS-433/533 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)

MLS-440/540 Medical Laboratory Science Seminar

This course is designed as a research seminar during which students and faculty present medical laboratory science research topics for discussion. Various research designs, sampling techniques and data analysis methods are discussed. Prerequisite: Departmental permission. (2)

MLS-447/547 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 Medical Laboratory Scientists work, eg, 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. Prerequisite: Departmental permission. (variable)

MLS-448/548 Professional Development V

Course involves various professional guest speakers from alternate sites in which Medical Laboratory Scientists work, ie, industrial firms, specialty hospitals, research facilities, etc. The professional will present to the students about their specific job, relating it to medical laboratory sciences. The purpose of these sessions is to inform the students of multiple professional opportunities for medical laboratory sciences in addition to working in a traditional hospital laboratory. Prerequisite: Departmental permission. (variable)

MLS-449/549 Professional Development VI

Continuation of MLS-448/548. (variable)

MLS-450/550 Laboratory Information and Automation Systems

Presents an overview of total laboratory automation (TLA) systems 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)

MLS-451/551 Quality Issues in Medical 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. Prerequisite: Departmental permission. (2)

MLS-452/552 Regulatory and Professional 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 MLS profession will also be discussed. Prerequisite: Departmental permission. (2)

MLS-453/553 Communications

Interpersonal and organizational communication techniques for creating effective communication with subordinates, peers and managers. Consultation and project management techniques will be included. Prerequisite: Departmental permission. (2)

MLS-455/555 Laboratory 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)

MLS-456/556 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. (variable)

MLS-460/560 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. Prerequisite: Departmental permission. (2)

MLS-461/561 Research Seminar II

Continuation of MLS-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 online 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. Prerequisite: Departmental permission. (2)

MLS-462/562 Research Seminar III

Continuation of MLS-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. Prerequisite: Departmental permission. (1)

MLS-467/567 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)

MLS-470/570 Clinical Practicum in Clinical 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. Prerequisite: Departmental permission. (variable)

MLS-471/571 Clinical Practicum in Hematology

Course includes application of basic skills learned in hematology coursework. 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. Prerequisite: Departmental permission. (variable)

MLS-472/572 Clinical Practicum in 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.

Prerequisite: Departmental permission. (variable)

MLS-473/573 Clinical Practicum in 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. Prerequisite: Departmental permission. (variable)

MLS-474/574 Clinical Practicum in Immuno-hematology

Rotation through the hospital blood bank laboratory. Applications of basic skills learned in student laboratory are practiced.

Instrumentation and advanced methodologies are emphasized.

Prerequisite: Departmental permission. (variable)

MLS-475/575 Clinical Practicum in Immunology and 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. Prerequisite: Departmental permission. (variable)

MLS-476/576 Clinical Practicum in 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. Prerequisite: Departmental permission. (variable)

MLS-478/578 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. Prerequisite: Departmental permission. (variable)

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)

MPH-511 Radiation Safety of Radioactive Materials

Course reviews basic nuclear and health physics principles/practices, regulations and instrumentation for the safe use of radioactive material. (2)

MPH-521 Therapeutic Radiological 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)

MPH-522 Dosimetry Applied to 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. Prerequisite: MPH-521. (2)

MPH-523 Brachytherapy Physics, Radiation Protection and Quality Assurance

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. Prerequisite: MPH-521. (2)

MPH-524 Special Topics in 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. (variable)

MPH-525 Radiotherapy Physics Review

Review of medical physics concepts for therapeutic radiology residents, dosimetry trainees and students and fellows in medical physics. (2)

MPH-526 Fundamentals of 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. (variable)

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)

MPH-541 Physics of Nuclear Medicine

The course covers mathematics and detectors used in nuclear medicine. Imaging instrumentation, including scintillation camera, emission tomography and application of the computer to nuclear medicine is also covered. (3)

MPH-542 Workshop in Radiopharmaceutical Science

Covers production of radionuclides, generators, formulation and Q.C. of tracers, in vitro and in vivo studies, dosimetry, radiation protection and safe handling. (1)

MPH-561 Physics of Diagnostic Radiology

Intermediate physics for residents in diagnostic radiology and nuclear medicine. Prerequisite: MPH-500. (3)

MPH-562 Physics of Nuclear Magnetic Resonance Imaging

This course is a basic introduction to the physical principles of MRI with emphasis on proton MRI. Topics covered will include fundamentals of magnetic resonance, relaxation times and the basis for imaging techniques. (2)

MPH-563 Topics in Diagnostic Imaging

Discussion of advanced topics in diagnostic imaging: mammography, digital imaging, ultrasound, quality assurance and radiation protection. Prerequisite: MPH-561. (3)

MPH-564 Digital Imaging

Course is organized as several computerized exercise modules, providing students with hands-on experience in various digital imaging concepts. (3)

MPH-565 Diagnostic Radiological Physics Review

Intensive review in all branches of medical radiological physics for preparation for the American Board of Radiology Certification Examination. Prerequisites: MPH-561. (3)

MPH-580 Master's Research

See course director for description. (variable)

MPH-601 Radiation Physics

Course provides a rigorous examination of the interaction with matter and heavy-charged particles with matter. (4)

MPH-602 Radiological Physics I

The course covers design and operation of accelerators; radiation quantities and units including stochastic and nonstochastic quantities; ion collection and recombination; and dosimetry systems used in therapeutic radiology and radiobiology. Prerequisite: MPH-601. (4)

MPH-603 Radiological Physics II

Continuation of MPH-602 (4)

MPH-604 Transfer Function Analysis

Starting with a rigorous presentation of Fourier transform theory, this course develops transfer function analysis for application to imaging systems. (2)

MPH-605 Methods of Photon Dose Calculation

Current methods of photon dose calculation for radiation treatment planning systems, particularly those using interaction kernels. Prerequisite: MPH-604. (2)

MPH-606 Methods of Electron Dose Calculation

Methods of electron dose calculation for radiation treatment planning systems, particularly those based upon Gaussian multiple-scattering theory. Prerequisite: MPH-604. (2)

MPH-607 Monte Carlo Methods

The EGS4 Monte Carlo code for photon/electron transport will be explained, with emphasis upon gaining hands-on experience in using this research tool. (2)

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. (variable)

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)

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. (variable)

MPH-623A Clinical Physics Practicum: Diagnostic Imaging

Students participate in providing clinical physics service under supervision. (variable)

MPH-623B Clinical Physics Practicum: Radiation Therapy

Students participate in providing clinical physics service under supervision. (variable)

MPH-623C Clinical Physics Practicum: Protection Radiation

Students participate in providing clinical physics service under supervision. (variable)

MPH-625 Research

Under the guidance of a faculty member and committee, the student originates, proposes and executes basic or clinical research. (variable)

MPH-900 Independent Study

The student will undertake a creative project design under the supervision of a faculty member. (variable)

NEU-501 Introduction to Neuroscience

Physiology of neurons and glia, synaptic processes, sensory receptor physiology, spinal cord, cerebellum and motor control, peripheral mechanisms in sensory systems and higher functions of nervous system. Neuroanatomical concepts correlated to the physiology. Prerequisite: ANA-451. (4)

NEU-502 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. (6)

NEU-511 Techniques in Neuroscience

Graduate students rotate through various faculty members' laboratories and master techniques commonly in use in neuroscience laboratories. (2)

NEU-525 Neuropsychopharmacology

Explores the fundamental pharmacodynamic mechanisms of drugs that act on the central nervous system. Drug classes to be studied will include anesthetic agents, opioids, antidepressants and spasmolytics. Each of the ten two-hour lectures will begin with an introduction about a particular disease or disease state, emphasizing the neurobiology of that particular disorder. A detailed description of the mechanism through which a given drug class interacts with that neurobiology to affect its treatment follows. Graduate students taking this class will be expected to perform outside reading that complements the various lecture topics. Two multiple choice exams will be given. In addition, graduate students taking this course will have to complete a written take-home final. The course is open to all Rush University graduate students who are interested in an in-depth review of the pharmacotherapy of central nervous system disease. (2)

NEU-544 Statistics and Experimental Design for Neuroscience

This course covers multiway 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)

NEU-551 Physiology of the Nervous System Function/Dysfunction

An introductory overview of central nervous system disease processes and their treatment. Disease states to be covered include those affecting the neuromuscular junction, the spinal cord, as well as the central nervous system. (4)

NEU-591 Advanced Neuroscience Proseminar

Taught jointly by participating faculty, seminar format is used to encourage extensive discussion and participation. (6)

NEU-598 Predissertation Research

Research credits prior to acceptance to doctoral candidacy. (variable)

NEU-681 Neurological Research

Students participate in ongoing research projects within the department. Areas of investigation include neuropharmacology, movement disorders, cerebrovascular disease, sleep disorders, epilepsy, neuromuscular disorders, multiple sclerosis, neurobiology of learning and memory, quantitative neuroimaging, age-related memory disorders and dementia. Participation in an ongoing project of a faculty member is the most practical. Prerequisite: NEU-601. (variable)

NEU-690 Special Topics in Neuroscience

Study of contemporary topics in neuroscience. (variable)

NEU-699 Dissertation Research

Research credits after admission to candidacy. (variable)

NEU-701 Neurology Core Clerkship

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. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

NEU-792 Advanced Neurology

This advanced clerkship is intended to provide students the opportunity to further develop their clinical skills in the evaluation of patients with neurologic conditions. Students will participate in the outpatient activities of the department, including the neuromuscular, dementia, movement disorder, epilepsy, general and/or multiple sclerosis clinics. This is a flexible program that will be structured by the course director, Dr. Soni, to best fit the interests of the individual student, based on availability. Those who are interested also have the option to rotate on the inpatient Neuro-ICU, Epilepsy/MS service, or the Endovascular service. Specific areas of interest should be discussed with the course coordinator, Christine Gillard, 12 weeks prior to the rotation start date. Rush students interested in enrolling for only two weeks should contact Christine Gillard to verify availability. (NA)

NEU-900 Independent Study

Specialized course work designed around the needs of an individual student. (variable)

NEU-7EI Neurology 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. (NA)

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. Prerequisite: Admittance to the RNFA course series. (3)

NFA-502 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: 1) Articulate the role of the RNFA throughout the continuum of care for the surgical patient; 2) Develop cognitive, psychomotor and affective behaviors that demonstrate accountability and responsibility for identifying and meeting the needs of the perioperative patient; 3) Utilize the nursing process as a foundation for practice; 4) Collaborate with the surgeon and other health care team members to achieve optimal patient outcomes and; 5) 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. Prerequisite: Admittance to the RNFA course series. (3)

NFA-999 Registered Nurse First Assist Continuous Enrollment

See course director for description. Prerequisite: Admittance to the RNFA course series. (3)

NGT-530F Pharmacotherapeutics in Anesthesia I

This course focuses on the pharmacokinetics and pharmacodynamics of intravenous, inhaled and local anesthetic agents and drugs that 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. Prerequisite: NRS-529. (3)

NGT-530G Pharmacotherapeutics in 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. Prerequisite: NRS-529, NGT-530F. (3)

NGT-531A Basic Principles of Anesthesia Nursing

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: NRS-521; Corequisite: NRS-541P, NGT-530F. (5)

NGT-531B Advanced Principles of Nursing Anesthesia Care

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. Prerequisite: NGT-530F, -531A; Corequisite: NRS-541P and NGT-530G. (4)

NGT-534B Management of the Adult Patient: Acute and Chronic 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. Prerequisite: NRS-534A; Corequisite: clinical practicum. (2)

NGT-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. Prerequisite: NNP, two credits; PNP and ACPNP students, three credits;

Corequisite: Health Assessment across the Lifespan, PNP and ACPNP Students. (2)

NGT-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)

NGT-649A DNP Immersion Residency/Forum

See course director for description. (4)

NGT-649B DNP Immersion Residency/Forum

See course director for description. (3)

NRS-502B Transition to the 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 marketplace. Prerequisites: NRS-502A and a minimum of four hours of NRS-541P. (2)

NRS-515P Nursing Care of Women and Newborns Practicum

Provides for clinical application of concepts learned in NRS-515. P/NP only. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-515. (1)

NRS-515 Nursing Care of Women and Newborns

Integrates interdisciplinary, evidence-based knowledge to provide nursing care to and promote optimal functioning of reproductive-age women, newborns and families in states of wellness or illness. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-515P. (2)

NRS-516P Nursing Care of Infants, Children and Adolescents Practicum

Provides for clinical application of concepts learned in NRS-516. P/NP only. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-516. (1)

NRS-516 Nursing Care of Infants, Children and Adolescents

Presents current research and theory for providing evidence-based, family-centered nursing care to infants, children and adolescents. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-516P. (2)

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. (1)

NRS-519 Public Health

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)

NRS-526PA Clinical Management in Acute Care Settings

Provides application of principles learned in NRS-526 to the acute care setting. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-526. (2)

NRS-526PB Clinical Management in Community Settings

Provides application of principles learned in NRS-526 to the community setting. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-526. (1)

NRS-526 Comprehensive Clinical Management Across Health Care Settings

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 of 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. Prerequisites: Satisfactory completion of didactic and practicum portions of all previous clinical courses; NRS-505, NRS-506, NRS-513, NRS-526A-P, NRS-526B-P. (2)

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. Prerequisites: NRS-533P, NRS-557. (1)

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. Prerequisites: NRS-529, NRS-530A, NRS-530B, NRS-533Q, NRS-558. (1)

NRS-532J Family Nurse Practitioner in Primary Health Care 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 lifespan as it relates to the pediatric patient for diverse clients. Prerequisites: NRS-503, -538, -529, -530E, -541P, -551, -555. (2)

NRS-532K Family Nurse Practitioner in Primary Health Care II

This course focuses on health care clinical judgment and decision-making with emphasis on diagnosis, treatment and patient care management as a Family Nurse Practitioner in women's health. The content also includes concepts of health maintenance, health promotion, disease prevention and risk appraisal across the lifespan as it relates to the female patient for diverse clients. Prerequisites: NRS-503, -538, -529, -530, -541P, -551, -555. (2)

NRS-532L-A Family Nurse Practitioner in 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 lifespan as it relates to the adult/geriatric patient for diverse clients. (1)

NRS-532L-B Family Nurse Practitioner in 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

lifespan as it relates to the adult/geriatric patient for diverse clients. (1)

NRS-532M Family Nurse Practitioner in Primary Health Care IV

This course focuses on health care clinical judgment, decision-making and patient care management as a Family Nurse Practitioner in the adult population. The content includes concepts of health maintenance, health promotion, disease prevention, disease management and risk appraisal across the lifespan as it relates to the adult/geriatric patient for diverse clients. Prerequisites: NRS-503, -538, -529, -530, -532J, -532K, -532L, -541P, -551, -555. (2)

NRS-534D Management of the 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. Prerequisite: NRS-534B. (1)

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)

NRS-541P Master Practica

A minimum of 12 quarter hours of specialty practice are planned conjointly by the master's student and faculty member. Prerequisite or corequisite: Core courses as determined by each program. Selected NRS-531 through 536, RN licensure. Clinical conference is included. Post-master's student requirements are individually determined. P/N grading (variable)

NRS-548 MSN Capstone

This course provides the graduating master's student with the opportunity to show knowledge of essential theory, incorporate research findings, demonstrate scholarly thought and evidence application/focus to a population/problem. This project may be either an Evidence-Based Practice Protocol or a Case Study/Management Project. Projects must be presented in both written and oral form. This project is the capstone evaluation for the MSN program. (variable)

NRS-670 Role Transformation

Course meets with DNP Capstone course. Topics include role transition and career development. (1)

NRS-677 DNP Capstone Project

Students present and critique capstone projects. Course requires two - to three-day onsite attendance. (2)

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)

NSG-501P Role of the 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)

NSG-501 Role of the 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)

NSG-502P Nursing Management of Common Health Alterations Across the Lifespan 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)

NSG-502 Nursing Management of 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 lifespan. 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)

NSG-503P Psychiatric and Mental Health Nursing 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. (3)

NSG-503 Psychiatric and Mental Health Nursing

This course examines the etiology, manifestations and clinical management of selected mental illnesses across the lifespan 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. (3)

NSG-504P Women's Health and Newborns Practicum

This course provides the opportunity for the learner to apply knowledge and skills in providing nursing care across the lifespan of women and the continuum of care. The learner will integrate evidence-based health promotion, health maintenance and risk reduction strategies in providing nursing care and health education. (3)

NSG-504 Women's Health and Newborns

This course presents physiological, psychosocial, cultural, developmental and ethical issues of women's health across the lifespan, 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)

NSG-505P Public Health Nursing Practicum

Students apply an ecological model to the nursing care of individuals, families and groups in the community. Skills are developed in promoting health and reducing risk for individuals and families 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. (3)

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. (3)

NSG-506P Nursing Management of Complex Health Alterations Across the Lifespan 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. (3)

NSG-506 Nursing Management of Complex Health Alterations Across the Lifespan

This course presents physiological, psychosocial, cultural, developmental and ethical concepts in the case management of complex health alterations across the lifespan. Inter- and intra-professional collaboration for ensuring quality health outcomes is emphasized. (6)

NSG-507 Comprehensive Exam

A comprehensive end-of-program examination. (1)

NSG-510 Pathophysiology for the 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. Prerequisites: Anatomy and physiology. (3)

NSG-511 Pharmacology for the 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. Prerequisite: NSG-510. (3)

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)

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 health care outcomes for a patient cohort/population. (I)

NSG-514 Immersion and Capstone: Clinical Nurse 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. (G)

NSG-521 Organizational and Systems Leadership

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 health care is integrated throughout the course. Prerequisite or Corequisite: Research for Evidence-based Practice. Corequisite: Research for Evidence-based Practice. (3)

NSG-522 Applied Epidemiology and Biostatistics for Nursing Practice

This course develops student's 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. Prerequisite: Undergraduate statistics. (3)

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. Prerequisite or Corequisite: Applied Epidemiology and Biostatistics for Nursing Practice. (3)

NSG-524 Health Promotion in Individuals and 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. Prerequisite: Applied Epidemiology and Biostatistics for Nursing Practice. (3)

NSG-525L Health Assessment across the Lifespan 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. Prerequisite for prelicensure students: Role of the Professional Nurse. Prerequisite for postlicensure students: Licensure as an RN, successful completion of an undergraduate Physical Assessment course, completion of Advanced Physiology and Advanced Patho (I)

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. Prerequisite for prelicensure students: Role of the Professional Nurse. Prerequisite for postlicensure students: Licensure as an RN, successful completion of an undergraduate Physical Assessment course, completion of Advanced Physiology and Advanced Patho (2)

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. Prerequisite: Advanced Pathophysiology. (3)

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)

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. Prerequisite or corequisite: Advanced Physiology, except PMHNP students. (3)

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)

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. Prerequisite: Advanced Pathophysiology and Advanced Physiology. (3)

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)

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. Prerequisite: Research for Evidence Based Practice; Organizational and Systems Leadership. (3)

NSG-541 Chemistry and 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)

NSG-542 Nurse 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)

NSG-543A Anesthesia Principles I: Basic Principles of Nurse Anesthesia

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 corequisite practicum course, there will be experiences that will allow the student 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. Prerequisite: Chemistry and Physics for Nurse Anesthesia; Corequisite: Nurse Anesthesia Practicum. (3)

NSG-543B Anesthesia Principles II: Advanced Principles of Nurse Anesthesia

This course is for the student who has a foundation in the basic principles and 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 and pharmacologic principles for each of the surgical specialty areas. Prerequisites: Anesthesia Principles I, Anesthesia Pharmacology; Corequisite: Nurse Anesthesia Clinical Practicum. (3)

NSG-543C Anesthesia Principles III: Obstetric & Pediatric Anesthesia

This course provides essential content for nurse anesthesia care in the specialty areas of obstetric and pediatric anesthesia. Learners will acquire knowledge related to the preoperative assessment of obstetric and pediatric patients, as well as the planning, implementation and evaluation of nurse anesthesia care provided to obstetric and pediatric patients undergoing diagnostic and surgical procedures. Prerequisites: Nurse Anesthesia Principles I and II; Corequisite: DNP Clinical Practicum. (3)

NSG-546 Developmental Physiology of the 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. Prerequisite: Advanced Physiology. (3)

NSG-547 Neonatal Pathophysiology

This course provides a graduate-level conceptual approach to principles and content in neonatal pathophysiology that forms 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. Prerequisite: Developmental Physiology of the Fetus/Neonate. (3)

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. Prerequisite: Advanced Physiology (core), Neonatal Pathophysiology. (3)

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)

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. Prerequisite: Developmental Physiology of the Fetus/Neonate, Neonatal Pathophysiology; Corequisite: Clinical Practicum. (3)

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. Prerequisite: Neonatal Management I; Corequisite: Clinical Practicum. (3)

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. Prerequisite: Neonatal Management II; Corequisite: Clinical Practicum. (3)

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. Prerequisite: Health Assessment across the Lifespan, PNP and ACPNP Students. (3)

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. Prerequisite: Advanced Primary Care of the Child I. (3)

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. Prerequisite: Advanced Primary Care of the Child II. (3)

NSG-556 Applied Pharmacology: Pediatric

In this course, pediatric advanced practice students apply a systematic process for therapeutic prescription plans for selected common acute and chronic health conditions. Prerequisite: Advanced Pharmacology; Corequisite: Advanced Primary Care of the Child I. (3)

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 I of a two-part series. Prerequisite: Advanced Primary Care of the Child I or equivalent; Corequisite: Clinical Practicum. (3)

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. Part 2 of a two-part series. Prerequisite: Pediatric Acute Care I; Corequisite: Clinical Practicum. (3)

NSG-565 Public Health Systems and the APHN Role

This course is the first in a series of Advanced Community/Public Health Nursing (APHN) practicum experience. Students will examine ethical, economic, financial and role issues relevant to community and public health care. The focus will be on helping students gain the knowledge, tools and experience to understand health care agencies, their roles and functions within the U.S. Health Care System and the role of the APHN in these agencies. Prerequisite: Leader as Change Catalyst; Health Care Economics, Policy and Finance; Applied Epidemiology and Biostatistics. Corequisite: APHN students: Specialty practicum, three credit hours. (3)

NSG-566 Population Assessment and 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. Prerequisites: Applied Epidemiology and Biostatistics, Research for Evidence-Based Practice; Prerequisite or corequisite for APHN and Pop Health MSN-DNP students: Public Health Systems and APHN Role, Specialty Practicum, three credit hours. (3)

NSG-567 Population Intervention Planning, Implementation and 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. Prerequisite: Population Health Assessment and Health Promotion Frameworks. Corequisite: Specialty Practicum (APHN students only). (3)

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)

NSG-569 Maternal Child Management for the 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. Prerequisites: Health Assessment across the Lifespan, Diagnostics for the Advanced Practice Nurse, Pharmacotherapeutics in Primary Care. Corequisite: Practicum. (3)

NSG-570A Pharmacotherapeutics Acute

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. Prerequisite: Advanced Pharmacology. (3)

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. Prerequisite: Advanced Pharmacology. (3)

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 evidence-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. Prerequisites: Pharmacotherapeutics, Health Assessment across the Lifespan: Specialty. Corequisite: Clinical Practicum. (3)

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 evidence-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. Prerequisite: Management: Adult/Gerontology I. Corequisite: Clinical Practicum. (3)

NSG-571C Management: Adult/Gerontology Critical Illness

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. Prerequisites: Management: Adult/Gerontology I and II, Pharmacotherapeutics for Acute Care. Corequisite: Clinical Practicum. (3)

NSG-572 Quality and 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 and patient safety are evaluated in the context of national trends and health care priorities. The essential role of interprofessional teams as a mechanism to improve quality and patient safety is addressed. Prerequisites: Research for Evidence-Based Practice, Organizational and Systems Leadership. Corequisites: Health Promotion for Individual and Clinical Populations, Leader as Change Catalyst. (3)

NSG-573 Aging Adults: Care and 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)

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. Prerequisites: Advanced Pharmacology, Neuropathophysiology. (3)

NSG-576 Neuropathophysiology: A 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. Prerequisite: Advanced Pathophysiology. (3)

NSG-577A Diagnostics and Management I: Psychiatric Assessment across the 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 lifespan demonstrating psychiatric symptoms. Prerequisite: Psychopharmacology. Corequisite: Practicum or with permission of instructor. (3)

NSG-577B Diagnostics and 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. Prerequisite: Diagnostics and Management I: Psychiatric Assessment across the Lifespan. Corequisite: Practicum or with permission of instructor. (3)

NSG-577C Diagnostics and 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 the assessment, planning and intervention in complex care of individuals with comorbid substance use and medical conditions. Prerequisite: Major Psychopathological Disorder. Corequisite: Clinical Practicum or with permission of instructor. (3)

NSG-601 Leader as Change Catalyst in an Evolving Health Care Environment

This course engages students in explorations of leadership. Advanced leadership principles and concepts are analyzed through case studies of exemplary leaders and self-assessment of leadership potential. Issues related to enacting the practice doctorate will be explored.

Prerequisite: Organizational and Systems Leadership for BSN-DNP Students. Corequisite: APHN BSN-DNP only: Applied Organizational Analysis and the Management of Human Resources. (3)

NSG-602 Health Care Economics, Policy and Finance

This course will examine current trends in health care policy and economics and their impact on financing and care delivery in the U.S. Using informatics as a tool, costs associated with specific health care delivery systems will be analyzed at the organizational level. (3)

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. Prerequisites: Applied Epidemiology and Biostatistics for Nursing Practice; Research for Evidence-Based Practice. Corequisite: Health Care Economics, Policy and Finance. (3)

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. Prerequisite: Effective Project Planning, Implementation and Evaluation, or Population Assessment and Health Promotion Frameworks. (I)

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. Prerequisite: DNP Project Planning I. Prerequisite/corequisite for FNP and APHN students only: Population Intervention Planning, Implementation and Evaluation. (I)

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. Prerequisite or corequisite: DNP Project Planning II. (I)

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. Prerequisite: DNP Project Planning III. (variable)

NSG-606 DNP/Specialty Practicum

Practica are planned jointly 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. Postgraduate student requirements are individually determined. P/N grading. [V] (variable)

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. (variable)

NSG-611 Financial and Business Concepts

This course will enable students to understand, apply and communicate the concepts required for effective financial planning, decision-making and management in health care programs and organizations. The long-term financial impact of practice changes will be assessed at the organizational level. Prerequisite: Health Care Economics, Policy and Finance. (3)

NSG-612 Applied Organizational Analysis and 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. Prerequisite: Health Care Economics, Policy and Finance. (3)

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. Prerequisites: Masters-level statistics, NSG-603 or NSG-566. Prerequisite or Corequisite: NSG-566. (3)

NSG-614 The Leader and Policy, Politics, Power and 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 policymaking 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. Prerequisites: Research for Evidence-Based Practice for BSN-DNP students; Health Care Economics, Policy and Finance. (3)

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. Prerequisites: Licensure as an RN, successful completion of an Undergraduate Physical Assessment course, completion of Advanced Physiology and Advanced Pathophysiology. Corequisite: Health Assessment Across the Lifespan. (1)

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 2 or 4 credit hours based on individual learning needs. (4)

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)

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)

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)

NSG-683 Ethical Conduct in Research Settings

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)

NSG-684 Intermediate Statistics

This course develops the student's knowledge of the application of database management principles and intermediate statistical principles in health care research. (3)

NSG-685 Multivariate Statistics

This course develops student's knowledge of the application of multivariate statistical principles in health care research. (3)

NSG-686 The Research Process: Quantitative Design and 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)

NSG-687 The Research Process: Quantitative Design and Methods Part 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)

NSG-688 The Research Process: Qualitative Design and 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)

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 health care challenges. (3)

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)

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. (variable)

NSG-699 Dissertation Research

The student contracts with faculty members and 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)

NTR-503 Leadership in Dietetics

Theories of leadership will be examined. Discussion focuses on practices and principles related to developing leadership skills. (2)

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)

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)

NTR-511 Supervised Experience in Food Systems Management

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)

NTR-513 Supervised Experience in Clinical Nutrition I

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. (2)

NTR-514 Supervised Experience in Clinical Nutrition II

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. (4)

NTR-515 Supervised Experience in Clinical Nutrition III

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. (4)

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. (5)

NTR-517 Supervised Experience in Clinical Nutrition V

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. (6)

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. (2)

NTR-521 Regulation of Macronutrient Metabolism in Human Nutrition

In this advanced 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)

NTR-522 Energy Metabolism and Bioactive Compounds in Human Nutrition

This advanced course in human metabolism integrates biochemical and molecular nutrition as it relates to the regulation of energy metabolism. The health impact of dietary supplements and phytochemicals as new bioactive molecules of interest in human health will also be covered. (2)

NTR-523 Advances in Vitamin and Mineral Nutrition in Human Nutrition

In this advanced course in human metabolism, students examine key metabolic pathways and physiological factors affecting micronutrient needs at various life stages. (2)

NTR-531 Application of Behavioral Change and Educational Theories in Nutrition Counseling and Education

Students plan, implement and evaluate a nutrition counseling project around specific dietary behavior and behavior change theory and strategies. Students share results of the experience and project with clinicians. (4)

NTR-534 Nutrition in Critical Care

This advanced-level supervised experience in enteral and parenteral nutrition provides current rationale and techniques for implementing and monitoring nutritional therapy in critically ill patients. Special attention is given to metabolic complications associated with enteral and parenteral feeding. (variable)

NTR-535 Nutrition in Pediatric Critical Care

This supervised practicum is based on scientific theory and practical application of nutrition support in critically ill infants/children. The focus of this experience includes nutritional requirements of premature infants, nutrition delivery in neonatal intensive care unit and enteral and parenteral nutrition therapies for pediatric patients with a variety of diseases and organ dysfunctions. (variable)

NTR-541 Integrating Nutrition in Disease Prevention and Treatment I

Students study the pathophysiology of disease and the interrelated role of nutrition in prevention, etiology and treatment of disease. Critical review and evaluation of the nutrition literature in prevention and treatment of acute and chronic disease are performed by students. (4)

NTR-542 Integrating Nutrition in Disease Prevention and Treatment II

Students study the pathophysiology of disease and the interrelated role of nutrition in prevention, etiology and treatment of disease. Critical review and evaluation of the nutrition literature in prevention and treatment of acute and chronic disease are performed by students. (4)

NTR-545 Nutrition Assessment

Students are required to interpret 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 are completed. (2)

NTR-549 Physiological Basis of Exercise and Nutrition

This course examines 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. Prerequisites: NTR-522, -542. (variable)

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 are examined. A major emphasis is placed on the findings garnered from major national surveys or trials and how findings have influenced nutrition policy, research and future prevention strategies is discussed. (2)

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 and nutrition initiatives with elected governing officials. Students will monitor and actively advocate for public policy impacting food and nutrition. (1)

NTR-560 Food and Nutrition Services Management

In this course, students focus on advanced practices and principles related to management of food and nutrition services in health care operations. (3)

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)

NTR-572 Nutrition Communication

This course presents various theoretical perspectives on health-related behavior change and factors that influence behavior. Students learn selection of strategies and design of interventions for nutrition communication with patients in inpatient and outpatient settings. (3)

NTR-582 Introduction to Research Methods

The course focuses 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)

NTR-583 Food Systems Operations Analysis

This course explores significant food systems management issues in the health care industry. (1)

NTR-590 Special Topics

Students conduct an in-depth examination of contemporary professional issues. Content varies according to topic choices by instructor. Prerequisite: Instructor approval. (variable)

NTR-592 Individualized Clinical Practice

Students complete advanced experience in one or more areas of clinical nutrition practice. Limited to clinical nutrition students. (variable)

NTR-595 Rationale for the Dietary Reference Intakes

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 is reviewed in both a historical context and one based on current literature. (2)

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. (variable)

NTR-601 Theory and Measurement of Protein and Energy Needs throughout the Lifecycle

Through lecture and group discussion students reviews the history and principles associated with assessment of protein and energy needs throughout the life cycle with an analysis of approaches appropriate for each application. Follow-up discussions address the controversies surrounding protein needs during aging and certain disease states, ie, AIDS, diabetes, congestive health failure, etc. Prerequisite: Departmental approval. (3)

NTR-602 Advanced Principles of Nutritional Epidemiology

Through seminar discussion, students interpret 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 is conducted. Examination of factor and cluster analyses used to describe dietary patterns of population subgroups is done. Prerequisite: Departmental approval. (3)

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 is assessed regarding the basis for tolerable upper limits for each vitamin. Prerequisite: Departmental approval. (3)

NTR-604 Critical Topics in Clinical Nutrition

This is an independent study/project in which the student in collaboration with faculty advisor chooses a topic of interest. The focus of this course is on thorough analysis and application of the topic. Prerequisite: Departmental approval. (variable)

NTR-605 Advanced Mineral Metabolism

This course provides students with an in-depth examination of the understanding of essential minerals 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 is assessed regarding the basis for tolerable upper limits for each mineral. Prerequisite: Departmental approval. (3)

NTR-606 Theory based Approaches to Promotion of Dietary Changes

Students explore theories of health behavior, targets for change and the methods for accomplishing dietary change in a variety of settings that characterize the diverse practice of nutrition and public health education, including worksites, hospitals, ambulatory care settings, schools and communities. Prerequisite: Departmental approval. (3)

NTR-607 Nutritional Response to Exercise

The physiological and metabolic adaptations to exercise and physical conditioning are examined. Special attention is given to the nutritional needs of the human body in response to specific types of exercise. Prerequisite: NTR-522, -542. (variable)

NTR-900 Independent Study

Students complete independent work on a selected topic. A literature search and written paper on a topic related to nutrition or food systems management is completed. Arrangements are made with advisor prior to registration. Prerequisite: Instructor approval. (variable)

NUR-517 Informatics for 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. (1)

OBG-703 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. (NA)

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. (NA)

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. (NA)

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. (NA)

OBG-781 Research in 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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

OBG-7E1 Obstetrics/Gynecology 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. (NA)

OCC-502 Occupational Therapy History and Philosophy

This course will provide an overview of the historical foundation of occupational therapy and how this foundation has shaped occupational therapy philosophy and practice. The student will be introduced to a variety of practice areas, the role of practitioners in these practice areas, professional organizations and philosophical beliefs that guide practice today. (4)

OCC-503 Occupation and Health Across the 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 lifespan 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 lifespan 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)

OCC-504 Human Structure and Principles of Movement

The primary goal of this course is to understand and evaluate the musculoskeletal system related to the skill components of occupational behavior. Biomechanical principles are presented with application to treatment 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)

OCC-505 Clinical Foundational Skills

The primary goal is for students to acquire basic clinical reasoning and practice skills as a foundation for their clinical practicum experience at Rush University Medical Center and in the community. (1)

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)

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)

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)

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 the 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)

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)

OCC-511 Occupational Therapy Interventions I

Students learn to apply theories and conceptual models for evaluation and restoration of occupational performance based on psychosocial principles. The occupational therapy planning and implementation process is introduced and developed through concurrent interface with the preclinical experience. (5)

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 preclinical experience. (5)

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. Students 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 preclinical experience. (5)

OCC-514 Occupational Therapy Interventions IV

Students learn to apply models and frames of reference for the prevention, development, evaluation, remediation and restoration of occupational performance as it relates to various pediatric populations. (4)

OCC-516 OT 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 various practice settings will also be completed. (1)

OCC-517 OT 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)

OCC-518 OT 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 this course. (1)

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)

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 to increase their own effectiveness in daily teaching with clients, families and colleagues. Experiences with both face-to-face interactions and distance education/training may be provided. (2)

OCC-532 OT 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)

OCC-536 Issues and Perspectives in Pediatric OT

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)

OCC-537 Issues and Perspectives in Geriatric OT

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)

OCC-538 Evaluation and 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 (ie, selection of assessments, interpretation and application of results) will be explored and implemented. Ethical considerations required in evaluation process will also be addressed. (3)

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)

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 nonprofessional staff, fiscal accountability, quality management, marketing/promotions and resource allocation will be presented. (2)

OCC-581 Qualitative Research Methods 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)

OCC-582 Research Methods and Evidence-Based 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. 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. 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)

OCC-583 Graduate Research Project

OCC-583 is a continuous course beginning in the eighth quarter with a grade and credit assigned upon completion of the thirteenth quarter. This course culminates the research sequence in the occupational therapy curriculum. It provides students with 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. (6)

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)

OCC-595 Advanced Fieldwork I

Supervised field experiences applying theoretical OT concepts on subjects having psychosocial/physical dysfunctions. Full-time student status is continued while engaged in fieldwork. (12)

OCC-596 Advanced Fieldwork II

Supervised field experiences applying theoretical OT concepts on subjects having psychosocial/physical dysfunctions. Full-time student status is continued while engaged in fieldwork. (12)

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)

OCC-598B Master's 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. (variable)

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. (variable)

OCC-900 Independent Study

Creative project designed by the student and supervised by faculty. (variable)

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)

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)

PAS-512 History and Physical Examination I

The PAS-512 and PAS-522 course series will prepare students to conduct effective medical interviews, use appropriate formatting to document and 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)

PAS-513 PA 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 Health Care Information Portability and Accountability Act (HIPAA), professional liability, laws and regulations regarding prescriptive practices, reimbursement, coding and billing, quality assurance and risk management. (1)

PAS-514 Diagnostic Methods I

The PAS-514 and PAS-534 course series 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) and blood gases. Using diagnostic testing in disease assessment and management including generation of the differential diagnosis is included throughout both courses. (2)

PAS-521 Clinical Medicine I

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; genitourinary 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)

PAS-522 History and Physical Examination II

The PAS-512 and PAS-522 course series will prepare students to conduct effective medical interviews, use appropriate formatting to document and 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 obstetric patient will also be covered. (3)

PAS-530 Microbiology and 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)

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)

PAS-533 Clinical 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/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)

PAS-534 Diagnostic Methods II

The PAS-514 and PAS-534 course series discusses the essentials of ordering, interpreting and performing clinical studies used in the screening, diagnosis, management and monitoring of human disease. 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)

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 psychosocial, physical and sexual development in children and adolescents. (3)

PAS-541 Clinical Medicine III

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; genitourinary 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)

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 and organ transplant surgery will be described. Pre- and postoperative patient assessment and management will be discussed. A lab component to the course will cover basic procedural skills required for clinical practice, such as aseptic technique, phlebotomy technique, IV placement, injection techniques, basic suturing skills, intubation and airway management, sterile gowning and gloving and insertion of nasogastric and foley tubes are taught as a subcomponent of this course. BLS and ACLS skills and certification will be obtained as a part of this course as well. (3)

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)

PAS-545 Emergency Medicine

This course will provide students with an introduction to the diagnosis and treatment of disease states and conditions encountered in emergency and urgent care settings. Lectures will discuss the role of triage, assessment and the management of commonly encountered medical, surgical, environmental and psychiatric emergencies as they present in the adult and pediatric populations. Students will also practice patient interview, physical examination and management skills through objective structured clinical examination (OSCE) scenarios. (3)

PAS-580 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)

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)

PAS-582 Internal Medicine

This clinical practice 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 problems. Students further develop their skills in history taking and physical examination, and review pathophysiologic principles as a guide to caring for patients. Students will develop an understanding of relationships between disease states and the patient from the medical, social and emotional points of view. The team approach 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 referral of patients. (8)

PAS-583 General Surgery

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 are presented. Technical experience is provided in the operating rooms. Lectures and conferences provide additional direct contact with medical school faculty. (8)

PAS-584 Women's Health

The student will learn routine obstetrics, gynecologic health maintenance and patient education. Identification and management of high-risk pregnancy, infertility, gynecologic oncology, family planning, psychosomatic disorders and normal psychological changes in obstetrics and gynecology as well as gynecologic surgery will be introduced. (4)

PAS-585 Pediatrics

Principles and practice of care of the patient from birth through adolescence are studied by providing direct patient care. Students will learn basic pediatric assessment, diagnosis and treatment. Clinical facilities of both inpatient and outpatient services of Rush University Medical Center and private physicians' offices are utilized. Seminars, conferences, lectures and case presentations provide additional learning experiences. Student assignments include

rotations in inpatient and ambulatory settings and the nursery. 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)

PAS-586 Behavioral Health

Provides exposure to major psychiatric disorders focusing on diagnosis and management. Emphasis on aspects of psychiatry relevant to primary practitioner with a holistic approach to patient care, recognizing significant biological, psychological and social/environmental factors contributing to the patient's illness. (4)

PAS-587 Long-Term Care/Geriatrics

Supervised clinical practice experience is provided in long-term care, with a focus on rehabilitative medicine and the care of patients with chronic disease. Physical therapy, occupational therapy and rehabilitation of patients with physical, psychological and social disabilities is introduced. (4)

PAS-588 Emergency Medicine

Students will see patients in all areas of the emergency department under supervision of attending physicians, PAs or advanced practice nurses. Students will perform histories and physical examinations, record their findings and discuss patients with attending physicians. Students will formulate diagnostic plans, bearing in mind the inherent time and cost factors. 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)

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)

PAS-590 Advanced Clinical Practice

This course consists of three 12-week rotations in a single focused area of advanced clinical practice. Students will select an area of clinical focus available in the following areas of practice: orthopedics,

cardiothoracic surgery, vascular surgery, emergency medicine, internal medicine and pulmonary, and critical care medicine. The advanced training rotations will generally require a minimum of 40 contact hours per week.

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.

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.

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.

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 health care across the adult lifespan. (30)

PED-701 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.(NA)

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.(NA)

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. (NA)

PED-715 Chronic Diseases In Children

Based at Shriners Hospitals for Children, students will participate in an active inpatient and outpatient program that provides referral services to children with musculoskeletal disorders, neural tube defects and other chronic diseases. Student should contact the Office of Medical Student Programs (AAC 524, X26915) four weeks prior to the rotation start date for: 1) A form authorizing a criminal background check, which must be returned to Shriners; 2) A drug-testing form and list of locations where the test can be performed at no charge; and (3) A copy of his or her immunization record. (NA)

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 that presents during the rotation. The student will be provided up to eight 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 to 20 minutes at the end of the rotation. (NA)

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 subintern 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. (NA)

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. (NA)

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. (NA)

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. (NA)

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 multidisciplinary conferences are held weekly. A course syllabus (two books of scholarly articles) will be provided; it may be picked up from the Chief Residents' Office. Students will be evaluated by completion of a 50-question open-book test, attendance, quality of write-ups and submission of a scholarly activity to be explained during the first few days of the rotation. (NA)

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. (NA)

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. Use of neurodiagnostic studies (EEG, brain imaging) and neurogenetic studies will be covered. The student will become familiar with common diagnoses such as epilepsy, migraine, autism, muscular dystrophy, developmental delay, tics and attention deficit disorder. (NA)

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. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

PED-793 Neonatal Intensive Care

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. (NA)

PED-794 Adolescent and 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. (NA)

PED-804 Adolescent and Young Adult Medicine

This course provides experience in outpatient settings, including a hospital-based adolescent clinic, an 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. Students will also participate in presentations for adolescent groups. (NA)

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. (NA)

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 staffings. (NA)

PED-7EI Pediatrics 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. (NA)

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. (4)

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. (4)

PHR-521 Laboratory Instrumentation

Course covers principles and applications of experimental equipment. Instrumentation includes ultraviolet and visible spectrophotometry, spectrophotofluorometry, thin-layer chromatography, column chromatography, high-pressure liquid chromatography, atomic absorption, liquid scintillation spectrometry, isotope use and handling, pH adjustment, sample weighing, melting point determination, hematocrit determination, centrifugation and glassware cleaning. (2)

PHR-542 Pharmacotherapeutics

The use of drugs in the diagnosis, prevention and treatment of disease is presented with special emphasis in clinical pharmacology. (variable)

PHR-556 Tools for Research

This course focuses on the practical computer skills required to work as a scientist in modern times. It includes didactic lecture and computer practice on PubMed, reference programs, Excel, Adobe Photoshop, Sigma Plot and importing into Word. Finally students are introduced to the research section of the NIH website with the emphasis on finding grant information and the mechanisms of online grant applications. (2)

PHR-561 Drug Biotransformation and 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 (eg, certain tumors and bladder) and the influence of age, gender, hepatic induction, kidney failure and genetic phenotypes. (3)

PHR-562 Toxicology/Drug to Drug Interaction/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)

PHR-568

This course will describe in detail the derivation and theory of pharmacokinetics. This course picks up where the general survey course given in PHR-501 leaves off and describes the mathematical constructs behind PK measures as well as in-depth discussion of two and multicompartment models. Upon completion of this course the trainee will be able to design and analyze results from a Phase I and II trials involving a drug acting in two compartments. (2)

PHR-573 Readings in Drug Abuse and Addiction

The literature on drug abuse will be surveyed. Areas of emphasis will include the role of DA in addiction, the concept of the addictive personality and the genetics of addiction, the neurobiology of incentive salience, dissociation of tolerance from euphorogenic effects, history of addiction theory and the unique aspects of various drugs of abuse. The ethics of chronic pain management in the clinical setting will also be discussed. (1)

PHR-585 Clinical Pharmacology Research

This survey course describes in detail all aspects of performing clinical drug trials. It includes extensive discussion on IND applications, how drug studies differ from other types of studies, GLP certification procedures, informed consent procedures involving drugs, the characteristics of Phase I-IV studies and the special considerations involved with each, packaging and delivery considerations, role of the pharmacokineticist in the design and implementation of these studies, sample and data collection

procedures, FDA oversight considerations, data analysis and interpretation, and laboratory responsibilities after the study is completed. (3)

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 receives a letter grade. For a letter grade, a public presentation or literature review is required for evaluation. (variable)

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. (2)

PHR-594 Advanced Receptor Pharmacology

This courses covers the various receptor subtypes with an emphasis on receptor activation and signaling and how such processes ultimately effect drug action. (3)

PHR-595 Readings 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. This course is typically an independent study or a Journal Club focused on a particular topic of interest to faculty or students. (variable)

PHR-595 Clinical Pharmacology/Commercial Practicum

This practicum involves actual patient contact time in the clinical pharmacology units within Rush as well as the Chicagoland area. The practice is designed to expose the clinical scientist to the practical aspects of conducting clinical pharmacology research in both an academic and commercial setting. Seminars on recruitment procedures, study coordinators, specialty needs and dealing with special populations will be provided. (2)

PHR-597 Clinical Pharmacology Thesis Research

A minimum of eight research hours must be completed. This will involve actual time collecting data in a clinical pharmacology study

either as part of an individual's own project or in collaboration with a mentor. As part of the requirements of this research, the investigator will have to either write an IND or a drug company research proposal as well as complete a written thesis and defend it publicly. (variable)

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. (variable)

PHR-622 Experimental Models in Pharmacology

Advanced laboratory courses focuses on techniques used in preparing experimental methods/models for research. By arrangement only. (variable)

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)

PHR-699 Dissertation Research

Laboratory research for the doctoral dissertation for PhD candidates only. By special arrangement. (variable)

PHY-501 Medical Physiology I

Comprehensive physiology course dealing with all major or an 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. (64)

PHY-502 Medical Physiology II

Continuation of PHY-501. Prerequisite: PHY-501. (58)

PHY-503 Physiology of Striated Muscle

Topics: fundamentals of excitation-contraction coupling, mechanics of muscle, equivalent circuit analysis, muscle biochemistry and developmental aspects of nerve and muscle. (4)

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)

PHY-511 Graduate Physiology I

Comprehensive physiology course dealing with all major organ 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)

PHY-512 Graduate Physiology II

Continuation of PHY 511. (5)

PHY-521 Mathematical Methods for Physiologists

Review of fundamentals of calculus in one dimension and generalization to several dimensions. Integration of basic functions, techniques of analytic and numerical integration and Fourier series and transforms will be presented. Applications to Physiology are stressed and include quantitative analysis of ion-sensitive fluorescent dye experiments, mathematical descriptions of kinetic experiments, reaction rate theory, theory of diffusion and image formation with microscopes. The equations of mechanics are taught toward explaining molecular dynamic modeling. (5)

PHY-524 Linear Differential Equations and Transform Methods

Study of first and higher order linear equation, linear algebra techniques, finite difference equations, Fourier series and transforms, Laplace transforms and applications to solution of differential equations. (4)

PHY-528 Programming-Numerical Method I

See course director for description. (3)

PHY-529 Programming-Numerical Method II

See course director for description. (3)

PHY-590 Special Topics in Physiology

Advanced course dealing with selected topics in physiology. Particular subjects vary from year to year. (variable)

PHY-598 Introduction to Research

A tutorial course designed to familiarize students with the literature and techniques applicable to modern physiological research. (variable)

PHY-640 Applied Electrophysiology

An advanced laboratory course introducing students to the basic techniques of modern electrophysiology. Prerequisites: PHY-502, -503, -523. (6)

PHY-651 Advanced Topics in Muscle Physiology

Topics include equivalent circuit of skeletal muscle, problems in excitation-contraction coupling and molecular events in the generation of mechanical force. Prerequisite: PHY-503. (3)

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 student's 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. Prerequisite: PHY-452. (variable)

PHY-699 Thesis Research

Post-candidacy research by arrangement. (variable)

PMR-781 Research in Phys Med & Rehab

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

PMR-79I Physical Medicine & Rehab

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. (NA)

PMR-7EI Physical Medicine & Rehab 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. (NA)

PRF-554 Advanced Topics

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. Prerequisites: PRF-523. (variable)

PRF-30I 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)

PRF-302 Pathophysiology of Cardiopulmonary Bypass I

Cardiovascular physiology and pathophysiology will be studied. Pathophysiology will include acquired and congenital heart diseases. Prerequisite: PRF-30I, PRF-33I. (5)

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. Prerequisites: PRF-302, PRF-332. (6)

PRF-31I 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. Prerequisites: PRF-30I, PRF-33I. (3)

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. Prerequisites: PRF 31I. (5)

PRF-313 Junior Seminar III

Special procedures in extracorporeal technology will be explored. Prerequisites: PRF-303, PRF-312. (3)

PRF-33I Anatomy and Physiology I

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. (3)

PRF-332 Anatomy and Physiology II

This course is the continuation of PRF-33I. The purpose of this course is to give students an overview of renal anatomy, physiology, 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)

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. Prerequisite: PRF-331. (3)

PRF-381 Introduction to Research and Project Design

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)

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. (10)

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)

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)

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)

PRF-441 Project Design and Research I

In the PRF-441, 442, -443 and -444 course series, the student will complete a research project suitable for submission to a peer-reviewed publication. Prerequisite: PRF-333. (2)

PRF-442 Project Design and Research II

In the PRF-441, 442, -443 and -444 course series, the student will complete a research project suitable for submission to a peer-reviewed publication. Prerequisite: PRF-333. (2)

PRF-443 Project Design and Research III

In the PRF-441, 442, -443 and -444 course series, the student will complete a research project suitable for submission to a peer-reviewed publication. Prerequisite: PRF-333. (2)

PRF-444 Project Design and Research IV

In the PRF-441, 442, -443 and -444 course series, the student will complete a research project suitable for submission to a peer-reviewed publication. Prerequisite: PRF-333. (2)

PRF-451 Senior Seminar I

In the PRF-451, -452 and -453 course series, advanced topics in extracorporeal technology will be discussed. Due to out-of-town clinical rotations, portions of this course material will be offered online. (1)

PRF-452 Senior Seminar II

In the PRF-451, -452 and -453 course series, advanced topics in extracorporeal technology will be discussed. Due to out-of-town clinical rotations, portions of this course material will be offered online. (1)

PRF-453 Senior Seminar III

In the PRF-451, -452 and -453 course series, advanced topics in extracorporeal technology will be discussed. Due to out-of-town clinical rotations, portions of this course material will be offered online. (1)

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)

PRF-502 Pathophysiology of Cardiopulmonary Bypass I

Cardiovascular physiology and pathophysiology will be studied. Pathophysiology will include acquired and congenital heart diseases. Prerequisites: PRF-501, PRF-521, NRS-551. (5)

PRF-503 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 inflammatory processes as they relate to the conduct of cardiopulmonary bypass. Prerequisites: PRF-502, PRF-502, PRF-522. (5)

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)

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. Prerequisites: PRF-510. (5)

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. Prerequisites: PRF-510, PRF-511. (3)

PRF-513 Seminar IV

Topics include medical imaging and diagnostic technology and pressure flow and resistance relationships. Prerequisites: PRF-510, PRF-511, PRF-512. (1)

PRF-521 Anatomy and Physiology I

Cardiovascular, respiratory, neural, renal and hepatic anatomy will be presented and discussed. (3)

PRF-522 Anatomy and Physiology II

This course is the continuation of PRF-521. The purpose of this course is to give students an overview of renal anatomy, physiology, 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)

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. Prerequisites: PRF-521. (3)

PRF-531 Clinical Experience I

In the PRF-531, -532, -533 and -534 courses, the student's clinical experience is represented. 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. Prerequisites: PRF-531, -532, -533. (10)

PRF-532 Clinical Experience II

In the PRF-531, -532, -533 and -534 courses, the student's clinical experience is represented. 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. Prerequisites: PRF-531, -532, -533. (10)

PRF-533 Clinical Experience III

In the PRF-531, -532, -533 and -534 courses, the student's clinical experience is represented. 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. Prerequisites: PRF-531, -532, -533. (10)

PRF-534 Clinical Experience IV

In the PRF-531, -532, -533 and -534 courses, the student's clinical experience is represented. 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. Prerequisites: PRF-531, -532, -533. (10)

PRF-541 Project Design and 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. Prerequisite: CHS -501. (3)

PRF-542 Master's Project I

In the PRF-542, -543, -544 and -545 course series, students will complete a master's project, which will be submitted for publication in a peer reviewed publication. Prerequisites: PRF-541, -542, -543, -544. (2)

PRF-543 Master's Project II

In the PRF-542, -543, -544 and -545 course series, students will complete a master's project, which will be submitted for publication in a peer reviewed publication. Prerequisites: PRF-541, -542, -543, -544. (2)

PRF-544 Master's Project III

In the PRF-542, -543, -544 and -545 course series, students will complete a master's project, which will be submitted for publication in a peer reviewed publication. Prerequisites: PRF-541, -542, -543, -544. (2)

PRF-545 Master's Project IV

In the PRF-542, -543, -544 and -545 course series, students will complete a master's project, which will be submitted for publication in a peer reviewed publication. Prerequisites: PRF-541, -542, -543, -544. (2)

PRF-551 Advanced Topics

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. Prerequisites: PRF-523. (variable)

PRF-552 Advanced Topics

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. Prerequisites: PRF-523. (variable)

PRF-553 Advanced Topics

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. Prerequisites: PRF-523. (variable)

PSC-781 Research in Psychology or 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. 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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

PSC-7E1 Psychology 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. (NA)

PSY-701 Psychiatry Core Clerkship

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. (NA)

PSY-783 Clinical 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 investigational medical treatment. The objectives of this clerkship are to become familiar with basic clinical research, including use of psychiatric rating scales and basic research design. (NA)

PSY-792 Psychiatric Consult (Med/Psych)

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. Visiting students must write a brief explanation of why they want to enroll in this clerkship and must submit a CV. Please contact Zaida Llera at Zaida_Llera@rush.edu for specific instructions regarding this information. (NA)

PSY-793 Child Psychiatry

Students will work with the Rush Therapeutic Day School, the medication clinics, a residential treatment center for emotionally and

behaviorally disturbed students and other 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 staffings, case conferences, departmental grand rounds and the Journal Club. Optional experience in school consultation at a therapeutic school for autistic children and Consult Liaison is available. Students will be supervised by faculty members and child psychiatry fellows. NOTE: To enroll, students must obtain approval of Dr. Adrienne Adams at Adrienne_Adams@rush.edu. (NA)

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). NOTE: Students must obtain approval of Dr. Dantz (Bezalel_Dantz@rush.edu) to enroll. (NA)

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. NOTE: Students must obtain approval of Dr. Dantz (Bezalel_Dantz@rush.edu) to enroll. (NA)

PSY-7EI Psychiatry 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. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

PTH-791 Pathology

This elective is intended for students considering post-graduate training in pathology, for students interested in experiencing the practice of pathology and for students interested in improving their diagnostic pathology skills. During the four- to six-week elective, the student will participate in the various services within the department, getting a taste of pathology residency training and learning about the crucial role of the pathologist within the health care system. On the surgical pathology services, the student will work with residents in the grossing room, where surgical specimens are described and sampled for microscopic analysis for routine and frozen section processing and for ancillary studies. The following day they will be able to preview and then to sign out the glass slides with the attending pathologist. At that time they will participate in the discussions that ensue and then do follow-up reading in specialty textbooks. On the autopsy service, they will help the resident with the dissection and, after presentation of the organs to the attending pathologist, help with the formulation of the preliminary autopsy report. They will also be exposed to several clinical laboratories by performing specific tasks in microbiology, molecular diagnostics, hematology and blood banking. On the last day of the rotation the student will give a 20-minute presentation to the members of the Pathology Department on a topic approved by the course director.

The student will be evaluated for participation, effort, knowledge and progress by the supervising attendings of the services and by the residents. Grading will be based upon these evaluations and on the depth and clarity of the final presentation. (NA)

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. (NA)

PVM-553 Observational Epidemiology

Course will provide an in-depth description of case control and cohort studies. This includes the different types (eg, 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 nonparticipation 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. (I)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

PVM-7EI Preventive Medicine 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. (NA)

RAD-7I1 Interventional Radiology

This clinical clerkship exposes the student to interventional radiology with emphasis on patient care. Both nonvascular 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. (NA)

RAD-7I2 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. (NA)

RAD-72I 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 rotate with multiple services, allowing exposure to different cancer sites. Students will attend multidisciplinary conferences and clinics. A 30-minute presentation on a topic regarding radiotherapy chosen by the student is expected for four-week electives. **IMPORTANT NOTE:** To take this rotation beginning 9/24/12, 10/18/12 and 10/22/12, students must obtain prior approval of the course director. (NA)

RAD-78I 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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

RAD-79I 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. (NA)

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 pathophysiologic correlation and case study. Literature review and individual topics are encouraged to provide in-depth study in the broad field of nuclear medicine. (NA)

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. (NA)

RC-31I Introduction to Respiratory Care

This course provides students with the history of the profession, the principles of chemistry, physics and infection control 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. Noninvasive monitoring techniques including oximetry, transcutaneous monitoring, capnography and simple pulmonary function testing will be included. This course also reviews clinical analyzing devices, patient safety, recordkeeping and an introduction to patient assessment, respiratory care pharmacology and evidence-based respiratory care. Prerequisite: Admission to the program. (5)

RC-312 Cardiopulmonary Physiology

This course 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.

Prerequisite: Admission to the program. (5)

RC-313 Respiratory Care Equipment and Techniques

This course 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, gauges and vacuum systems. Maintenance of artificial airways, fiberoptic bronchoscopy, thoracentesis, chest tube maintenance and arterial blood gas sampling will also be discussed. 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)

RC-321 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 and cardiovascular monitoring. Prerequisites: RC-31I, RC-312. (5)

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 postoperative patient will be reviewed.

Prerequisites: RC-31I, RC-312, RC-313. (5)

RC-323 Mechanical Ventilation

This course provides instruction in the theory, set-up, operation and maintenance of mechanical ventilators and related equipment. Noninvasive ventilators and high-frequency oscillators will also be discussed. Topics include: mechanical ventilator theory, ventilator operation, ventilator maintenance and troubleshooting. Prerequisites: RC-311, RC-312, RC-313. (4)

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)

RC-331 Critical Respiratory Care

Provides instruction on all phases of adult critical care and continuous mechanical ventilation. 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 noninvasive patient monitoring will be covered. Hemodynamic monitoring will include arterial pressure monitoring, central venous and pulmonary artery catheters and cardiac output measurement. Noninvasive monitoring techniques including oximetry, capnography and ECG monitoring will be included. Prerequisites: RC-311, RC-312, RC-313. (5)

RC-332 Cardiopulmonary Diagnostics and 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 12-lead ECG interpretation, nutritional assessment, sleep disorders and testing, stress and exercise testing, metabolic testing and noninvasive cardiology. Prerequisites: RC-312, RC-313. (5)

RC-333 Pediatric and Neonatal Respiratory Care

The processes of growth and development relating to respiratory care from the fetus to the adolescent will be discussed. This course 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, pediatric assessment, pediatric respiratory care and mechanical ventilation of the neonatal and pediatric patient. Prerequisite: RC-312. (5)

RC-334 Clinical Observation I

Students will observe and achieve competencies related to respiratory care procedures in general medical and surgical floors. 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. Prerequisites: RC-311, RC-313. (2)

RC-401 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. Credit at the graduate level requires completion of a course project Prerequisite: Admission to the Department. (5)

RC-404 Clinical Observation II

Students will observe and achieve competencies related to respiratory care procedures in adult intensive care units. 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, arterial puncture, blood gas analysis and noninvasive monitoring. Prerequisite: RC-534. (2)

RC-411 Clinical Practice I

This course provides students the opportunity to further develop both basic and advance skills required in the intensive care of the respiratory patient. Topics include patient assessment; medical gas therapy; aerosol therapy; incentive spirometry; positive pressure breathing; chest physiotherapy; airway care using nasal, endotracheal and tracheal tubes; initiation of mechanical ventilation;

patient stabilization and monitoring; evaluation of hemodynamic variables; bronchial hygiene; evaluation for weaning; endotracheal intubation; extubation; arterial line sampling; arterial puncture; blood gas analysis; and noninvasive monitoring. The students will also complete a pulmonary function, bronchoscopy observation, long-term care and pediatric rotations. Prerequisite: Satisfactory completion of first-year coursework. (12)

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 and RRT examinations preparation. Current issues relevant to respiratory care will be explored to include new treatments and technologies and issues related to professional development and practice. Prerequisite: Second-year status. (3)

RC-421 Clinical Practice II

This course provides an opportunity to acquire clinical experience in the intensive care of neonatal and pediatric patients. Topics include patient assessment, medical gas therapy, aerosol therapy, incentive spirometry, chest physiotherapy, airway care, initiation of mechanical ventilation, patient stabilization and monitoring, evaluation of hemodynamic variables, bronchial hygiene, evaluation for weaning, endotracheal intubation, monitoring (invasive and noninvasive), labor and delivery assistance and transport. Prerequisite: RC-411. (12)

RC-422 Clinical Seminar II

Case presentations are required to integrate clinical and theory. Emphasis will be placed on decision-making and problem-solving as they relate to neonatal and pediatric respiratory care. Current issues relevant to the neonatal and pediatric respiratory care will be discussed. Review of respiratory care will continue as it pertains to the certified (CRT) and registry (RRT) credentialing examinations administered by the National Board for Respiratory Care (NBRC). 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)

RC-431 Clinical Practice II

This course provides an opportunity to advance the student's clinical experience in neonatal and pediatric respiratory care in the areas of patient assessment and monitoring (invasive and noninvasive), mechanical ventilation, ECMO, airway care, labor and delivery assistance, and transport. Students will also have an opportunity for

reinforcement of adult intensive care. In addition, students are provided with an opportunity in home health, skilled nursing facility, pulmonary rehabilitation and sleep. Prerequisite: RC-421. (12)

RC-432 Clinical Seminar II

Case presentations are required to integrate clinical and theory. Emphasis will be placed on decision-making and problem-solving as they relate to clinical respiratory care and disease management. Current issues relevant to respiratory care will be discussed, including ethical issues in health care, smoking cessation, palliative care and issues related to professional development and practice. Review of respiratory care as it pertains to the credentialing examinations administered by the National Board for Respiratory Care (NBRC) will continue. 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)

RC-511 Introduction to Respiratory Care

This course provides students with the history of the profession, the principles of chemistry, physics and infection control 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. Noninvasive monitoring techniques including oximetry, transcutaneous monitoring, capnography and simple pulmonary function testing will be included. This course also reviews clinical analyzing devices, patient safety, recordkeeping and an introduction to patient assessment, respiratory care pharmacology and evidence-based respiratory care. Prerequisite: Admission to the program. (5)

RC-512 Cardiopulmonary Physiology

This course 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)

RC-513 Respiratory Care Equipment and Techniques

This course 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, gauges and vacuum systems. Maintenance of artificial airways, fiberoptic bronchoscopy, thoracentesis, chest tube maintenance and arterial blood gas sampling will also be discussed. 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)

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 and cardiovascular monitoring. Prerequisites: RC-511, RC-512. (5)

RC-522 Pulmonary Disease

Topics include the etiology, pathophysiology, diagnosis, treatment and prognosis of common pulmonary diseases and conditions. Respiratory care management of nonrespiratory 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 postoperative patient will be reviewed. Prerequisite: RC-512. (5)

RC-523 Mechanical Ventilation

Provides instruction in the theory, set-up, operation and maintenance of mechanical ventilators and related equipment. Noninvasive

ventilators and high-frequency oscillators will also be discussed.

Topics include mechanical ventilator theory, ventilator operation, ventilator maintenance and troubleshooting. Prerequisites: RC-511, RC-512, RC-513. (4)

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)

RC-531 Critical Respiratory Care

Provides instruction on all phases of adult critical care and continuous mechanical ventilation. 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 noninvasive patient monitoring will be covered. Hemodynamic monitoring will include arterial pressure monitoring, central venous and pulmonary artery catheters and cardiac output measurement. Noninvasive monitoring techniques including oximetry, capnography and ECG monitoring will be included. Prerequisites: RC-511, RC-512, RC-513. (5)

RC-532 Cardiopulmonary Diagnostics and 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 12-lead ECG interpretation, nutritional assessment, sleep disorders and testing, stress and exercise testing, metabolic testing and noninvasive cardiology. Prerequisite: RC-512. (5)

RC-533 Pediatric and Neonatal Respiratory Care

The processes of growth and development relating to respiratory care from the fetus to the adolescent will be discussed. This course 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, pediatric assessment, pediatric respiratory care, and mechanical ventilation of the neonatal and pediatric patient. Prerequisite: RC-512. (5)

RC-534 Clinical Observation I

Students will observe and achieve competencies related to respiratory care procedures in general medical and surgical floors. 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. Prerequisites: RC-511, RC-513. (2)

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. Prerequisite: Admission to program. (5)

RC-562 Management

Management principles and problems as they relate to respiratory care and the management of the department, hospital, service organization and health programs will be discussed. Prerequisite: Admission to program. (5)

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)

RC-564 Clinical Observation II

Students will observe and achieve competencies related to respiratory care procedures in adult intensive care units. 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, arterial puncture, blood gas analysis and noninvasive monitoring. Prerequisite: RC-534. (2)

RC-571 Clinical Practice I

This course provides students the opportunity to further develop both basic and advance skills required in the intensive care of the respiratory patient. Topics include patient assessment; medical gas therapy; aerosol therapy; incentive spirometry; positive pressure breathing; chest physiotherapy; airway care using nasal, endotracheal, tracheal tubes, initiation of mechanical ventilation, patient stabilization and monitoring; evaluation of hemodynamic variables; bronchial hygiene; evaluation for weaning; endotracheal intubation; extubation; arterial line sampling; arterial puncture; blood gas analysis and noninvasive monitoring. The students will also complete a pulmonary function, bronchoscopy observation, long-term care and pediatric rotations. Prerequisite: Satisfactory completion of first-year coursework. (12)

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 and RRT examinations preparation. Current issues relevant to respiratory care will be explored to include new treatments and technologies and issues related to professional development and practice. Prerequisite: Second-year status. (3)

RC-573 Research Project I

Guided activities to develop an appropriate research question and research methodology for completion of the required research requirements. This course also includes an introduction to basic testing and/or procedures used in basic sciences research, such as gene arrays, essays, cell cultures and mouse colony management. Prerequisite: Second-year status. (2)

RC-581 Clinical Practice II

This course provides an opportunity to acquire clinical experience in the intensive care of neonatal and pediatric patients. Topics include patient assessment, medical gas therapy, aerosol therapy, incentive spirometry, chest physiotherapy, airway care, initiation of mechanical ventilation, patient stabilization and monitoring, evaluation of hemodynamic variables, bronchial hygiene, evaluation for weaning, endotracheal intubation, monitoring (invasive and noninvasive), labor and delivery assistance and transport. Students are also given the opportunity to further develop their adult critical care skills. Prerequisite: RC-571. (12)

RC-582 Clinical Seminar II

Case presentations are required to integrate clinical and theory. Emphasis will be placed on decision-making and problem-solving as they relate to neonatal and pediatric respiratory care. Current issues relevant to the neonatal and pediatric respiratory care will be discussed. Review of respiratory care will continue as it pertains to the certified (CRT) and registry (RRT) credentialing examinations administered by the National Board for Respiratory Care (NBRC). 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)

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)

RC-591 Clinical Practice III

This course provides an opportunity to advance the students clinical experience in neonatal and pediatric respiratory care in the areas of patient assessment and monitoring (invasive and noninvasive), mechanical ventilation, ECMO, airway care, labor and delivery assistance, and transport. Students will also have an opportunity for reinforcement of adult intensive care. In addition, students are provided with an opportunity in home health, skilled nursing facility, pulmonary rehabilitation and sleep. Prerequisite: RC-581. (2)

RC-592 Clinical Seminar III

Case presentations are required to integrate clinical and theory. Emphasis will be placed on decision-making and problem-solving as they relate to clinical respiratory care and disease management. Current issues relevant to respiratory care will be discussed, including ethical issues in health care, smoking cessation, palliative care and issues related to professional development and practice. Review of respiratory care as it pertains to the credentialing examinations administered by the National Board for Respiratory Care (NBRC) will continue. 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)

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)

RC-401/561 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. Prerequisite: Admission to the program. (5)

RC-402/562 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 the program. (5)

RC-403/563 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 the program. (5)

REL-7EI Religion/Health 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. (NA)

RMD-510 Cell and Molecular Biology

Cellular and Molecular Biology 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. In order to successfully complete this block, students should be able to: recognize that the function of a biomolecule is dependent on its structure; identify and describe the function of cellular organelles; describe the function of biomolecules in normal cellular processes; analyze physiological functions (predict and explain responses) at the molecular and cellular levels; integrate physiological functions at the molecular and cellular levels organization to solve problems; demonstrate knowledge about the potential use of biomolecular tools for the diagnosis, treatment and prognosis of disease conditions; recognize that the basic goal of molecular medicine is to identify and utilize molecules that will retard or block diseases processes in order to restore normal function. (NA)

RMD-511 Immunology and Hematology

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 nonspecific defense mechanisms, inflammation, immunodeficiencies, hypersensitivity, serology, tumor and transplantation immunology, vaccines, serum proteins and hemostasis. Upon completion of the block, the student will be able to: diagram the structure of the five classes of human antibodies and list their functions, describe their genetics and biosynthesis and explain their roles in host defence against infection; diagram the structure of the T-cell antigen receptor and compare it with antibodies in structure and function; describe the location, structure and function of cells and organs of the immune system; diagram the structure of the major histocompatibility gene complex and the structures and assembly of the HLA molecules; explain how they acquire foreign peptides and describe how this is integral to their biological function in T-cell antigen recognition; diagram in detail the interactions of antigen-presenting cells with T-cells, T-cells with B-cells and T-helper cells with cytotoxic T-cells; describe the role of macrophage activation and cytotoxic T-cell activation in cellular immune-mediated host defense against intracellular pathogens; describe the main regulatory mechanisms operative in the immune system, with special emphasis on the unique roles of TH1 and TH2 helper T-cell subsets; describe the cellular and humoral events in innate immunity and

inflammation that protect the host prior to the initiation of an adaptive immune response; describe the circulation of lymphocytes through the body and the lymphoid organs; distinguish between the histological appearance of the spleen, thymus and lymph nodes and describe their unique structural characteristics; identify diffuse lymphoid tissue in organs throughout the body; describe the differences between the different tonsils; identify the normal sites of hematopoiesis in the fetus and adult; describe the origin and development of the erythrocyte, platelet, granulocyte and monocyte; describe the significance of cell lineages and cell colonies and growth factors as they relate to hematopoiesis; describe the normal percentages for the various blood cells and how they may change in disease states; describe the specific functions of circulating blood cells; describe the general mechanisms and regulatory processes that control hematopoiesis; describe the structure and function of principal plasma proteins; describe the intrinsic and extrinsic hemostasis pathways and the regulatory mechanisms of these pathways. (NA)

RMD-512 Musculoskeletal System

This course is entitled Musculoskeletal Block and is designed to integrate information and topics between physiology, anatomy, histology and biochemistry. This course is a survey of the musculoskeletal system. The block integrates the structure, function and organization of muscle, nerve, skin, bone and connective tissues with an emphasis on the Back Pain case and the Joint Pain 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 aging processes within these systems. Control mechanisms (neural, humoral and mechanical) 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 musculoskeletal 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 course, students should be able to: Describe the structure and function of general and specialized connective tissue; describe the embryologic development of musculoskeletal structures; compare and contrast the mechanism and regulation of contraction of the three different types of muscle, beginning with the cellular/molecular level through the gross

anatomic/movement level; describe the structure, function/s and control of the musculoskeletal system in normal movement and posture; explain the principles behind the musculoskeletal components of a standard physical examination; describe the growth, remodeling and repair of bone; include the control mechanisms (humoral and mechanical) and the effect of nutrition; apply understanding of the molecular, cellular and anatomic basis of musculoskeletal abnormalities to specific clinical scenarios; describe the organization of the Nervous System at the gross anatomic, tissue and cellular level; describe the structure and function of the skin and the associated glands. (NA)

RMD-513 Cardiovascular and Respiratory Systems

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 of the autonomic nervous system and its function as it relates to the cardiovascular and respiratory systems. It will also cover structures of the thoracic wall and their relation to respiratory function. Upon completion of the course, the student will be able to describe the anatomic boundaries and relationships, location, structure and function of the organs and tissues of the cardiovascular system and correlate these to physical exam findings, radiographic images and ultrastructural images; explain the fundamental concepts that govern fluid physics; describe how blood circulates through the body, including structure and function of specialized circulatory systems (portal, coronary, pulmonary, lymphatic and venous) and the mechanisms that maintain vascular tone and circulating volume in changing conditions; using the heart as an example, describe the mechanisms of membrane transport and ion movement; explain how these result in the generation, propagation and transmission of information within and between cells and tissues; explain the autonomic nervous system's control of the cardiovascular system; describe the structure and function of the heart as a pump, including the mechanics of cardiac function; describe the alterations in normal structure and function that occur with cardiovascular disease; describe the regulation of body temperature. (NA)

RMD-514 Gastrointestinal System and Metabolism

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 understanding of a limited number of disease states related to

dysfunction of organs of the digestive system or digestive system function. Upon completion of the block, the student will be able to: Describe the boundaries and organizational features of the abdominal wall and cavity; describe the embryologic development of the gastrointestinal tract and related organs; describe the function and structure of the alimentary canal and associated organs; describe the circulatory, neural and exocrine components associated with the gastrointestinal tract; describe the structures and mechanisms that govern how and when food moves through the gastrointestinal tract; describe and explain the structural and functional features and regulatory mechanisms that control the digestion of food, the absorption of nutrients and the elimination of waste products; describe the utilization of nutrient molecules from absorption through elimination by different organs of the body; describe the central role of the liver in metabolism and outline liver specific synthetic and metabolic pathways; describe and explain the involvement of multiple organs in maintaining caloric and glucose homeostasis under normal challenges (feed-starve cycle and exercise). (NA)

RMD-515 Genitourinary Systems

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 understanding of a limited number of disease states related to dysfunction of organs of the digestive system or digestive system function. Upon completion of the block, the student will be able to: Describe the embryological origin and development of the structures of the organs of the reproductive system, including the hormonal regulation of this development; describe the structures and the organs of the reproductive system. Correlate the functions of these structures and organs with their gross and microscopic organization; describe the structures and the organs of the urinary system. Correlate the functions of these structures and organs with their gross and microscopic organization; describe the regulation of filling and voiding of the bladder; describe how renal blood flow and glomerular filtration rate are controlled and measured; list the components of urine and describe the processes that result in the formation of each component; describe how the body controls the pH of the blood and the kidney's contribution to the maintenance of an acid-base balance; describe how the kidney handles ions (Na, K, Cl, Ca and phosphate) and water; describe the role of the kidney in regulation of body fluid osmolarity; define the body fluid compartments, their contents and the movement of water and solutes between them; explain the hormonal and neural control of the

reproductive system; describe the hormonal changes associated with the following: female menstrual cycle, pregnancy, placental formation, labor and delivery, lactation and menopause; discuss the impact of sex hormones on other organ systems. (NA)

RMD-516 Nervous System and Head and Neck

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 aging 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 neurobehavioral 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. (NA)

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 reshaped if the student's interests or career goals change. Students will identify topic-related learning objectives that correspond to their current coursework. (NA)

RMD-518 Capstone II

This is a 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 identified that relates to their theme. (NA)

RMD-523 Mechanisms of Disease

This course has two distinct parts. The first three weeks is focused on the general principles of the basis of diseases and drugs. The latter two weeks are focused on Infectious Disease. The block is front-loaded with didactic activity as it forms the basis of subsequent blocks. Principles learned in this block are developed in the subsequent blocks and include: defining the general principles of pharmacology; recognition of the basic principles of microorganisms and the taxonomy and specific characteristics of bacteria, fungi, parasites and viruses; definition of the general principles of antimicrobials; recognition of the general principles of cellular injury and death; description of inflammation and tissue repair; identification of the concepts and terminology of neoplasia; distinguishing between the intrinsic and extrinsic mechanisms of neoplasia; identification of alterations in physiology that occur in common disease states and how these alterations manifest clinically; determination of the significance of symptoms, signs and ancillary data as they relate to a disease state; development of differential diagnoses for common presenting symptoms and physical exam

abnormalities; identification of appropriate diagnostic modalities in the evaluation of various disease states. (NA)

RMD-524 Diseases of the Cardiovascular and Respiratory Systems

This course is a survey of the pathology, pathophysiology and pharmacology that related to diseases of the cardiovascular and respiratory systems, including: identification of alterations in physiology that occur in heart and lung disease states and how these alterations manifest clinically; recognition of the significance of symptoms, signs and ancillary data as they relate to cardiovascular and pulmonary disease; construction of differential diagnoses for common presenting symptoms and physical exam abnormalities of cardiovascular and pulmonary disease; identification of appropriate diagnostic modalities in the evaluation of various cardiovascular and pulmonary diseases; description of the pathology of the cardiovascular and pulmonary systems; description of the mechanism of action and use of drugs used to treat heart and lung disease. (NA)

RMD-525 Diseases of the Genitourinary Systems

This course is a survey of the pathology, pathophysiology and pharmacology that related to diseases of the genitourinary systems, including: identification of alterations in physiology of the genitourinary system and how these manifest clinically; recognition of the significance of symptoms, signs and ancillary data in the evaluation of genitourinary disease; description of the pathology of the genitourinary system; description of the mechanism of action of drugs used to treat disorders in the genitourinary system; construction of differential diagnosis for common presenting symptoms and physical exam findings of genitourinary disease. (NA)

RMD-526 Diseases of the Central Nervous System

This course is a survey of the pathology, pathophysiology and pharmacology that related to diseases of the central nervous system (CNS), including: identification of alterations in physiology of the CNS and how these manifest clinically; recognition of the significance of symptoms, signs and ancillary data in the evaluation of CNS disease; description of the pathology of the CNS; description of the mechanism of action of drugs used to treat disorders in the CNS; construction of differential diagnosis for common presenting symptoms and physical exam findings of CNS disease. (NA)

RMD-527 Gastrointestinal, Liver and 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. (NA)

RMD-528 Hematology, Dermatology and 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. (NA)

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 (eg, understanding the impact of a new therapy when expressed as an odds ratio for development of a negative outcome). (NA)

RMD-531 Physicianship I

The two-year Physicianship Program is a patient-centered, integrated, multidisciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes and behaviors, as well as prepare students for full-time clinical duties beginning with their third-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations. At the close of the program for the M1 year, with the completion of this

course and RMD-532, the student should be able to: elicit and record an accurate history related to the chief complaint of patients; participate as a member of the health care team in an ambulatory setting; perform and record selected elements of a physical exam on fellow students; utilize language to express your sensitivity to others; develop and express self-awareness regarding biases and perceptions of others; accept and adapt to feedback on progress or weaknesses in communication skills; participate in small group discussions and apply content to your role as a health care provider. (NA)

RMD-532 Physicianship II

The two-year Physicianship Program is a patient-centered, integrated, multidisciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes and behaviors, as well as prepare students for full-time clinical duties beginning with their third-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations. At the close of the program for the M1 year, with the completion of this course and RMD-531, the student should be able to: elicit and record an accurate history related to the chief complaint of patients; participate as a member of the health care team in an ambulatory setting; perform and record selected elements of a physical exam on fellow students; utilize language to express your sensitivity to others; develop and express self-awareness regarding biases and perceptions of others; accept and adapt to feedback on progress or weaknesses in communication skills; participate in small group discussions and apply content to your role as a health care provider. (NA)

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. (NA)

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. (NA)

RMD-720 Careers in Medicine

The purpose of this elective is to allow third-year medical students at Rush to explore specialties into which they can match upon graduation from medical school (either into a categorical or advance program). 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 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 course will culminate in the student self-reflection on whether to pursue the specialty for residency. The specialties available will be those into which students can match into upon graduation from medical school (either into a categorical or advance 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). (NA)

RMD-781 Basic Biomedical Research I

RMD-781 is one of a two-term course series 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. (NA)

RMD-782 Basic Biomedical Research II

RMD-782 is one of a two-term course series 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. (NA)

RMT-504 Physicianship IV

The two-year Physicianship Program is a patient-centered, integrated, multidisciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes and behaviors, as well as prepare students for full-time clinical duties beginning with their third-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations. At the close of the program for the M1 year, with the completion of this course and RMD-532, the student should be able to: elicit and record an accurate history related to the chief complaint of patients; participate as a member of the health care team in an ambulatory setting; perform and record selected elements of a physical exam on fellow students; utilize language to express your sensitivity to others; develop and express self-awareness regarding biases and perceptions of others; accept and adapt to feedback on progress or weaknesses in communication skills; participate in small-group discussions and apply content to your role as a health care provider. (NA)

RMT-505 Physicianship V

The two-year Physicianship Program is a patient-centered, integrated, multidisciplinary program designed to provide students with a foundation of clinical knowledge, skills, attitudes and behaviors, as well as prepare students for full-time clinical duties beginning with their third-year core clerkships. The Physicianship Program is competence-based and aligned with national recommendations. At the close of the program for the M1 year, with the completion of this course and RMD-532, the student should be able to: elicit and record an accurate history related to the chief complaint of patients; participate as a member of the health care team in an ambulatory setting; perform and record selected elements of a physical exam on fellow students; utilize language to express your sensitivity to others; develop and express self-awareness regarding biases and perceptions of others; accept and adapt to feedback on progress or weaknesses in communication skills; participate in small-group discussions and apply content to your role as a health care provider. (NA)

RSA-501 Management Principles and 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. Prerequisite: Admission to the program. (4)

RSA-502 Theory of Grants and 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. Prerequisite: Admission to the program. (4)

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, multicenter clinical studies, data collection and progress reporting, study budget preparation and the financial management of clinical studies. Prerequisite: Admission to the program. (4)

RSA-512 Budgeting and 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 contracts, managing accounts receivable, and preparing and negotiating an Facilities and 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. Prerequisite: Admission to the program. (4)

RSA-514 Legal, Ethical and 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 noncompliance. 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. Prerequisite: Admission to the program. (4)

RSA-516 Intellectual Property and Technology Transfer

This course will introduce students to U.S. 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. Prerequisite: Admission to the program. (4)

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. Prerequisites: Satisfactory completion of first-year coursework. (4)

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. Prerequisite: RSA-596A. (4)

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. Prerequisites: Satisfactory completion of first-year coursework. (2)

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. Prerequisite: RSA-598A. (2)

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. Prerequisite: RSA-598B. (2)

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)

SBB-581 Principles and Methods of Antibody Identification

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. Prerequisites: General knowledge of immunohematology and consent of the instructor. (2)

SBB-582 Blood Procurement and 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 and function of blood, blood donor suitability, collection, serological testing, transfusion infectious diseases and their testing, component preparation, labeling, storage

and distribution. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor. (3)

SBB-583 Blood Bank and 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, pretransfusion testing and administration of blood components. Focus on quality management systems: QC, QA, QM, blood utilization management and error management. Taught only online. Extensive computer use required. Prerequisites: General knowledge of immunohematology and consent of the instructor. (3)

SBB-584 Clinical Immunohematology and 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 and pediatric transfusion practice; hemolytic disease of the newborn; transplantation; anemias; and 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)

SBB-585 Selected Topics and 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)

SBB-586 SBB Clinical Practicum

Field experience under supervision of a professional expert in a blood center and/or hospital transfusion service setting. All students enrolled in the SBB curriculum must participate in clinical site visits and serologic resolution of clinical specimens. Clinical sites include but are not limited to apheresis centers, donor centers, stem cell processing centers and transfusion service centers. 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. (variable)

SBB-587 SBB 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. All students enrolled in the SBB curriculum must participate in a research project and develop a presentation for a professional audience. (3)

SUR-701 Surgery Core Clerkship

The Core Clerkship in Surgery will consist of an eight-week general surgery component in the M3 year. During Surgery, 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 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. (NA)

SUR-710 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 subintern are at the level of the first-year resident, namely, subinterns 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. (NA)

SUR-712 Surgical Intensive Therapy

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 subinterns with direct patient responsibilities. (NA)

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. (NA)

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. (NA)

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. (NA)

SUR-731 Pain Management

This rotation exposes the experienced student to the care and management of patients with low back pain, post-herpetic neuralgia, 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. (NA)

SUR-751 Orthopedics

This fourth-year elective rotation in Orthopedic Surgery is intended for students considering a career path requiring a 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. VISITING STUDENTS: See special instructions in "Please note the following information" section. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

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. (NA)

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. If the clerkship is taken for

four weeks, the student will gain experience in performing history and physical examinations and will work up patients to present to resident and attending physicians during the second two-week period. In addition, the student will learn to perform more sophisticated techniques of examination, including slit lamp funduscopy examination and indirect ophthalmoscopy. In general, the student will gain hands-on experience in ophthalmic examination, diagnosis and theory. (NA)

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. (NA)

SUR-771 Thoracic Surgery

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 learn surgical technique with hands-on experience during cutting-edge thoracic surgery procedures. (NA)

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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

SUR-782 Research in Anesthesia

Students will participate in new or ongoing research projects within the Anesthesiology Department. There will be close one-on-one

collaboration between the student and faculty member. Research projects are available in both basic (animal lab, biochemistry lab) and clinical sciences. Current areas of investigation include: neuropharmacology, pharmacokinetics and treatment of acute and chronic pain in animals. Clinical studies involve the application of the significant findings from basic research in neuropharmacology to acute and chronic pain management in patients. The educational objective of the clerkship is to train clinical investigators in the field of anesthesiology. Rush 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 Medical Student Programs 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 eight weeks' maximum credit for coursework in a single subspecialty. This decision is at the discretion of the Office of Medical Student Programs. (NA)

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 third-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 fourth-year students rotating in Advanced Surgery will take part in the in-house call schedule on a shared rotating basis with third-year students. The work is primarily with hospitalized patients; however, there is an opportunity for ambulatory and elective surgery. The grade is determined primarily (65%) by clinical evaluations submitted by surgery residents and attendings. There is no limit as to the number of evaluations that may be turned in on one's behalf. Proper behavior, attitude and demeanor are therefore paramount. Students are encouraged to participate to the full extent possible, show initiative, teach third-year students, follow their patients closely and must be punctual for all activities. Twenty-five percent of the grade is determined by a classroom presentation of a clinical case with review of pertinent literature. Ten percent of the grade is based on a witnessed history and physical exam. Students meet weekly with Dr. Saclarides to discuss interesting cases and for the clinical presentations of the various students. (NA)

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 preoperative evaluation and preparation of surgical and obstetric patients. (NA)

SUR-796 Transplantation

The clinical aspects of transplantation, including donor and recipient surgery, and preoperative and postoperative care are studied. The student participates in organ preservation care as well. Seminars on the fundamental and clinical aspects of transplant immunology are held. (NA)

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. Multilevel supervision and guidance is provided by the attending physicians and residents as well as the clinical support staff. (NA)

SUR-7EI Surgery 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. (NA)

VAS-30I Vascular Anatomy, Physiology and Pathophysiology

This course is a detailed survey of the large, small and microscopic vasculature 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 pathophysiologic processes will also be presented. (3)

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)

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)

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)

VAS-311A Ultrasound Physics Topics in Doppler and Color

This course is actually a segment of VAS-31I (Ultrasound Physics and Physical Principles I) and 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 Doppler effect, Doppler equation, angle steering, angle correct, sample volume, spectral analysis, velocity measurement, color display and color direction, among other related topics. (2)

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)

VAS-31I Ultrasound Physics and Physical Principles I

The basic principles of sound and ultrasound are introduced. Important math concepts are reviewed. The emphasis in this course is on the theories of ultrasound, including the basic parameters of sound, the Doppler effect, continuous wave Doppler, pulsed wave Doppler and Doppler color flow. (3)

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. Prerequisite: VAS-31I and VAS-311L (Physical Principles and Ultrasound Physics I and Physics I Lab). (3)

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, CPR training, universal precautions 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)

VAS-32I Patient Care Practices

Vascular technologists not only use noninvasive equipment, but also 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)

VAS-331L Venous Ultrasound Procedures 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)

VAS-331 Venous Ultrasound Procedures

The theories, techniques and processes for performing deep vein thrombosis (DVT), chronic venous insufficiency (CVI) and vein mapping studies of the lower and upper extremities are presented primarily through the use of Duplex ultrasound. Indications, data analysis, reporting, patient cases and problem-solving procedures for testing patients with venous disease are also covered. These skills will be addressed in the didactic section and practiced in the laboratory portion of this course. (2)

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)

VAS-341 Arterial Physiologic Procedures

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 for testing patients with arterial disease are also covered. (3)

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)

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)

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)

VAS-361L Abdominal Vascular Ultrasound 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)

VAS-361 Abdominal Vascular Ultrasound 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)

VAS-371L Advanced Vascular Testing Lab

The advanced vascular procedures including upper extremity venous duplex, chronic venous insufficiency scanning, vein mapping, native arterial duplex for upper and lower extremities, 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)

VAS-371 Advanced Vascular Testing and Topics

More advanced examinations will be presented in this course, including duplex scanning of the native arteries (upper and lower extremities), bypass grafts, arteriovenous fistula, pseudoaneurysms, dialysis access grafts and intraoperative procedures. Indications, data analysis, reporting, patient cases and problem-solving procedures for testing patients with complications/diseases are also covered. Prerequisites: Venous, arterial, cerebrovascular procedures, the respective laboratory courses, Physics I and Physics II. (3)

VAS-381L Introduction to Research Lab

Students will perform basic research studies related to vascular technology in this course. (1)

VAS-381 Introduction to Research

The technologist who is to be a life-long learner and contribute to the knowledge base of his or her field needs to have an understanding of the methods of research available and how to use them. This course is an introduction to research processes and a basic analysis of research papers. Test validation procedures are also covered in this course. Prerequisites: Venous, arterial, cerebrovascular, abdominal procedures, laboratory courses, Physics I and Physics II. (2)

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 and body mechanics are also covered for the technologist to care for himself in an intellectually, emotionally and physically demanding profession. (3)

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)

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 three to four vascular exams from a list of 16 possible procedures. The plan is then 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 2.0. (10)

VAS-415B Clinical Skills in Vascular Ultrasound II

During VAS-415B, VAS-415C and VAS-415D, students will rotate through one to three other clinical sites. The student and the clinical instructor will create a plan of study for each quarter that will entail learning at least four new clinical skills that 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. (6)

VAS-415C Clinical Skills in Vascular Ultrasound III

During VAS-415B, VAS-415C and VAS-415D, students will rotate through one to three other clinical sites. The student and the clinical instructor will create a plan of study for each quarter that will entail learning at least four new clinical skills that 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. (6)

VAS-415D Clinical Skills in Vascular Ultrasound IV

During VAS-415B, VAS-415C and VAS-415D, students will rotate through one to three other clinical sites. The student and the clinical instructor will create a plan of study for each quarter that will entail learning at least four new clinical skills that 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. (6)

VAS-420A Professional Skills I

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in honesty, interrelationships with patients and staff, cleanliness, efficiency, judgment, initiative, communication, constructive criticism, professional growth, HIPAA compliance, learning from mistakes and confidence. 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)

VAS-420B Professional Skills II

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in honesty,

interrelationships with patients and staff, cleanliness, efficiency, judgment, initiative, communication, constructive criticism, professional growth, HIPAA compliance, learning from mistakes and confidence. These skills were taught during the junior year, particularly in the professional practices and patient care classes, and are practiced in a clinical setting. (I)

VAS-420C Professional Skills III

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in honesty, interrelationships with patients and staff, cleanliness, efficiency, judgment, initiative, communication, constructive criticism, professional growth, HIPAA compliance, learning from mistakes and confidence. These skills were taught during the junior year, particularly in the professional practices and patient care classes, and are practiced in a clinical setting. (I)

VAS-420D Professional Skills IV

Students will practice professional skills during each quarter of the senior year and be evaluated on particular characteristics in honesty, interrelationships with patients and staff, cleanliness, efficiency, judgment, initiative, communication, constructive criticism, professional growth, HIPAA compliance, learning from mistakes and confidence. These skills were taught during the junior year, particularly in the professional practices and patient care classes, and are practiced in a clinical setting. (I)

VAS-425A Cumulative Clinical Skills in Vascular Ultrasound I

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. (4)

VAS-425B Cumulative Clinical Skills in Vascular Ultrasound II

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. (4)

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. (4)

VAS-43I Senior Lectures/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. (I)

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, write and present case studies from the patient exams they have performed at their clinical sites. (I)

VAS-433 Senior Lectures/Case Presentations III

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. (I)

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; abdominal procedures with the respective laboratory courses, clinical course instruction for three quarters, Physics I and Physics II. (2)

VAS-480A Senior Lectures and Comprehensive Review of Physics Topics in Doppler and Color

This course is a segment of VAS-480 and is available to advanced placement students in the Vascular Ultrasound program. Students will

attend lectures on a variety of advanced topics and participate in Vascular Lab Conference. The Doppler, color and hemodynamics topics covered in VAS-311A will be reviewed and a comprehensive exam comprised of questions on these topics will be given at the end of the course. Prerequisite: VAS-311A. (I)

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