BMC-500 Musculoskeletal Biology

Provides the fundamental elements of the biology of musculoskeletal tissues. Topics include bone, intervertebral disk, articular cartilage, meniscus, muscle, and tendon & ligament structure, function, cells, development, and basic biomechanics. Credit(s): 3

BTN-523 Career Planning

The landscape of the job market for biomedical graduates has changed over the past decade in that a wider range of career paths are being pursued. This alteration in the job market requires not only more individualized career planning for each student, but also practical adjustments to the traditional course offerings in graduate school to enable our graduates to be more competitive for post training careers. This course will expose students to essential information that will complement their other didactic and laboratory-based training, and help them identify their strengths to use them to help develop a concrete and effective goal-oriented individualized plan for their career development. Credit(s): 1

CRE-561-HF-1 Introduction to Epidemiology

This course is designed to introduce the theories and concepts of epidemiology. It will provide a comprehensive and accessible introduction to epidemiological methods. Specifically, the course will focus on the application of these theories and concepts to the practice of public health. Topics to be discussed include epidemiological terminology, measurement of disease, disability and health in population groups, vital statistics and reportable disease mechanisms, procedures for infectious and chronic disease control. Course Objectives: 1.Define epidemiology as the study of the determinants of health and illness in populations and the examination of factors contributing to health promotion, 2.Disease prevention and the use of health services. 3.Describe the major epidemiological research study designs and their advantages and limitations. 4.Understand the basic terms and methods used in: (i) outbreak investigation and infectious disease epidemiology, (ii) chronic disease epidemiology, (iii) evaluation of screening tests, and (iv) disease prevention and treatment trials. 5.Identify public and private data resources available for epidemiological studies and evaluate the quality, integrity, and comparability of various data sources; and, 6.Understand and apply descriptive epidemiology principles. 7.Apply ethical principles and cultural sensitivity when accessing, collecting, analyzing, using, maintaining, and disseminating epidemiological data and information. Credit(s): 2

GCC-519 Intro to Neuroscience

This course will provide students with an understanding of basic graduate neuroscience topics. At the completion of this course, the student will learn: 1. Describe the components and anatomy of the nervous system (central nervous system and peripheral nervous system) 2. Describe the molecular and cellular physiology of neurons 3. Understand the functional and structural organization of the human brain including the central nervous system (brain and spinal cord) and peripheral nervous system 4. Learn about learning and memory neurological disorders Credit(s): 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. Credit(s): 2

GCC-548 Bioinformatics

This course provides a practical, broad-based foundation in biomedical informatics. Topics in acquisition, analysis, and storage of information in health care, biomedical research, and public health will be presented. The course will primarily use a problem-oriented interactive format to illustrate meaningful applications of information technology. Publicly available large data sets and tools will be used to teach basic techniques in data collection and queries, visual presentation of data, comparative effectiveness analysis, decision support, natural language processing, and genomics. No computer programming skills are required. Credit(s): 1

GCC-571 Human Centered Health Systems Integration

Students will explore the various aspects of complex health ecosystems and related issues. They will explore Human Centered Design of Health Care Systems with entrepreneurial mindset. To better design the future systems with better human-system integration. Students will learn principles of Human Systems Integration theory and explore design methods to understand, model and design interconnections, value webs and future systems and services. The students will learn to elicit new behaviors and create solutions that benefit all stakeholders essential to optimizing health systems. Students will also learn context and get an immersive view of health care systems and introduction to public health. They will be able to apply methods of systems design as part of their semester long project in health care systems design. Students will explore the concepts of stakeholder needs mapping, empathy for consumers of services, co-design for creating value and services as well as systems integration with key elements of innovation. Students will also learn to create ideas and prototype solutions iteratively with evaluations done frequently. This class will also teach students how to build impactful presentations on systems design. Credit(s): 2

GCC-611 Cancer Biology I

In this pro-seminar series students will learn the underlying molecular and cellular biology involved in carcinogenesis, tumor growth, and metastasis, with an emphasis on modern techniques and strategies used to dissect these mechanisms and 'target' tumor cells. This course will provide the student with a solid background in general cancer biology with knowledge of the latest concepts in signal transduction, metabolic reprogramming of tumor cells, cell cycle control, and cancer therapeutics as well as a general appreciation of the rapid advances made recently in the area of cancer research. Students will learn: 1) how cellular processes are altered during cancer, 2) how different cancer types are being modeled and studied in the laboratory, and 3) how novel therapeutic strategies are being developed to target an individual tumor based upon its genetic mutational status. Credit(s): 3

GCC-900 Independent Study: Biomedical Entrepreneurship

Medical technology innovators face unique challenges – intellectual property, a complex market, diverse stakeholders, and barriers to disruption and adoption. This course will expose students to real-world perspectives of the innovation and commercialization process, as well as provide the opportunity to

conceive, develop, and pitch a healthcare solution as part of an interprofessional team of fellow students. This course will utilize the first 4 steps of the Biodesign process – Needs Finding, Needs Screening, Concept Generation and Concept Screening. The final two steps (Implementation) are covered more in-depth in other course offerings. Guest speakers will provide real world examples of the medical technology entrepreneurship process. Credit(s): 1

GCC-900 Independent Study: Design Health Innovation

Students will explore the different aspects of complex health ecosystems and learn how to practice innovation design in healthcare with human centered design (HCD) philosophy. Students will learn basics of innovation mindset and application of human centered systems design methods to the problems they want to address. Students will explore the concepts of empathy, co-design for creating value and understanding users of services and products as key elements of innovation. Students will also learn to create ideas and prototype solutions iteratively with evaluations done frequently. Students will also explore value webs and business modeling to convert their ideas from just ideas to viable0 businesses. This class will learn story telling aspects of business pitch and practice presentation of innovation to investors and other interested stakeholders.

Key take away for students: Apart from HCD methods for innovation design, students will be able to talk about principles and methods of human centered design. Additionally, students will take away problem-solving techniques and process of design thinking. Credit(s): 2

IMM-507 Basic Immunology I

Introduction to immunology, with emphasis placed on the components, nature, and organization of the immune system. Credit(s): 3