BIOMEDICAL GRADUATE STUDIES (BIOM)

**BIOM 5020 Molecular Basis of Disease**
BIOM 502 introduces students to basic mechanisms of disease and examines a different disease each week. The focus of the course will be on understanding the pathophysiology of the diseases and how research has enhanced not only our knowledge of disease mechanisms but has also led to improved therapy for patients with these diseases. This course is reserved for BGS students only. Prerequisite: Permission of course director.
Spring
1 Course Unit

**BIOM 5100 Case Studies in Translational Research (CSTR) (Open to MD/PhD and VMD/PhD students only)**
This course is open to MD/PhD, VMD/PhD and Biomedical Graduate Studies PhD students. All second year combined degree students are expected to take this course unless excused by Dr. Brass. Enrollment is limited to 24 students but interested VMD/PhD and BGS students are welcome as space permits. Prerequisite: Must be in the MD/PhD or VMD/PhD program and have completes the first year of training. CSTR is a seminar style course where groups of students work with selected Penn faculty to prepare a discussion and literature review on disease topics. Topics will include gene therapy for hemophilia, retinal disease and wound healing, cytokine therapies for immune disorders, genetic sleep disturbances and vaccine development. Most of the course will focus on the analysis of successful translational research projects that are taking place here at Penn.
Fall
1 Course Unit

**BIOM 5550 Regulation of the Genome**
Regulation of gene expression including chromatin structure, transcription, DNA modification, RNA processing, translation, control of gene expression via microRNAs and post-translational processing. Prerequisite: Permission of instructors.
Spring
1 Course Unit

**BIOM 6000 Cell Biology**
BIOM 6000 is a beginning-to-intermediate-level graduate school course designed to introduce students to the molecular components and physiological mechanisms that underlie the structure and function of eukaryotic cells. The course emphasizes core cell biology concepts by describing both landmark experiments and methods as well as current scientific research questions and technical approaches. Lectures will focus on discoveries involving: (i) molecular mechanisms of cellular communication; (ii) intracellular compartmentalization, protein-vesicle targeting, and organelle biogenesis; (iii) mechanisms of membrane transport and excitability; (iv) cytoskeletal architecture, cell adhesion, and cell motility; and (v) cell fate. The main goal of the course is to provide a strong foundational basis for the biomedical student's graduate education especially in the practice of solving research problems in the context of cell biology. The format and content of the course conveys to students not only how scientists what they know but also the tremendous excitement that has paralleled rapid advances in understanding cell structure, organization, and function in recent years. Permission of instructor required to enroll.
Fall
1 Course Unit

**BIOM 6100 Foundations in Statistics**
Technological advances have transformed biomedical research, making the generation of complex and high-dimensional datasets routine, and underscoring the importance of robust statistical methods for data analyses. In this course, students will learn to use the open-source R programming language to explore foundational topics in statistics, including regression, hypothesis testing, survival analysis, inference, and handling missing data. The course will be virtual and asynchronous (self-paced) and will leverage online resources, including DataCamp.com.
Spring
1 Course Unit