2017 SPRING Biological Chemistry Courses					
Class No.	**Course No.**	**Title**	**Day, Time, Room**	**Cr. Hrs.**	**Semester**
16452	**BLCHM 6200**	**Literature Review and Problem Solving**	**T & TH, 3:00PM-5:00PM, HSEB 3515B**	**2.0**	**First Half**
In order to teach the skills required to be a successful independent scientist this course will teach students how to digest and analyze papers and problem solve, both of which will review and apply material from core coursers. The instructors will develop specific course content. Topics may include: How to read a paper (read at home, discuss in class); Survey of the core services; Problem solving with open-ended problems posed on real-life or made-up situations. A focused effort will be made to help students identify topics that they can develop into grants in the Spring term. Grading will be based on participation and individual work. Cross-listed with MBIOL 6200					
16453	**BLCHM 6300**	**Guided Grant Preparation**	**T & TH 3:00PM-5:00PM, HSEB 3515B**	**2.0**	**Second Half**
To prepare students for their thesis research, prelims, and qualifying exams, we will offer a guided grant preparation course in the second half of the Spring semester that builds on their experience earlier in the semester (critical reading of primary literature and problem solving). The guided grant writing course will provide an opportunity for students to create an original research proposal by critical review of other grants, training in hypothesis generation, scientific writing, and experimental design. The written original grant proposal will be used as a basis for an oral qualifying examination by a faculty committee. Cross-listed with BLCHM 6300 Oral Capstone: The written original grant proposal prepared in the Guided Grant Preparation course will be used as a basis for an oral capstone examination by a faculty committee. This exam will ensure that students meet our standards for thesis work and review material from the core courses before they join a department and lab. Students will prepare an R21-style grant proposal (~6 single-spaced pages, covering 2 years of work) to be submitted 5 days before the exam. They will present and defend the proposal in front of a 3-member capstone exam committee.					
2822	**BLCHM 7960**	**Research Lab Rotation**	**3rd Rotation: 1/17 - 3/3/2017**	**2.0**	
A signed Rotation Verification Form and an e-mailed copy of the rotation report must be submitted to the Program Office in order to receive a credit.					
Choose 3 electives (see elective list) Students are recommended to register for 2 electives first half semester and one elective second half semester. *Classes from the Biochemistry, Medicinal Chemistry/Chemical Biology, and Structual Biology/Biophysics tracks listed below are recommended.*					
Students must be registered full time for between 9-12 graduate credit hours. Electives vary by year and semester and many are taught every other year.					

Biochemistry Track					
4543	**BIO C 6600**	**Metabolic Regulation**	**Lindsley**	**1.5**	**Second Half**
This half-semester course will begin with a review of carbohydrate and lipid metabolic pathways, with an emphasis on an integrated understanding the pathways and what is known about their regulation. The course will progress to an in-depth analysis of current research in specific areas of nutritional sensing and metabolic regulation. **T, Th 9:30-11:00 AM, HSEB 2908** *(note starts 10 min earlier than usual class times)*					
	BIO C 6420	**Advanced Biochemistry**	**Kay/Sundquist**	**1.5**	**First Half**
This course will focus on biochemical and biophysical approaches to studying proteins and their functional interactions. Topics covered will include: protein-ligand interactions, cooperativity and allostery, protein folding and design, spectroscopic techniques, analytical ultracentrifugation, calorimetry, biosensors, proteomics approaches, and protein structure prediction. Please note this course is taught every other (even) year. Not Offered Spring 2017 - Expected Spring 2018 2016: T, Th 9:40-11:00, HSEB 2908					
14139	**CHEM 7470**	**Nucleic Acid Chemistry**	**Burrows**	**2.0**	**First Half**
Three lectures, one discussion per week for 7.5 weeks. Topics include chemical synthesis of DNA and RNA, nucleoside and oligomer analogs, chemistry of DNA damage and repair, nucleic acid-targeted drugs and binding agents. **M, W, Th, F 8:35-9:25, LS 107**					
Chemical Biology/Medicinal Chemistry Track					
6875	**MD CH 7891**	**Fundamentals of Drug Discovery & Design**	**Schmidt**	**2.0**	**First Half**
In this half-semester course, we cover the basics of drug development and evaluation. The principles of pharmacokinetics, ADME and structure-activity relationships are emphasized. Students will leave the class with the ability to discuss major trends in drug discovery and development, understand the structure-activity relationships and mechanisms of action of major drug classes and appreciate the drug discovery and development process from a chemist's perspective. **M, W, F 1:00-2:00, HSEB 4100C**					
8480	**MD CH 7895**	**Understanding Therapeutically Relevant Biomolecules**	**Barrios**	**2.0**	**Second Half**
In this half-semester course, we cover several classes of therapeutically relevant biomolecules, including nucleic acids, peptides, carbohydrates, natural products and synthetic molecules. Key aspects of each class of molecules will be discussed, with an emphasis on recent scientific developments in the field. Students will leave the class able to explain the therapeutic relevance of several classes of molecules, analyze the primary literature and design experiments to test key questions at the interface between chemistry and biology. **M, W, F 1:00-2:00, HSEB 4100C**					

Structural Biology/Biophysics Track

17503	**BLCHM 6430**	**Structural Methods**	**Goldenberg/Hill**	**1.5**	**First Half**

This course provides an integrated approach to the applications of NMR and X-ray crystallography in structural biology. Topics covered include: basic NMR theory, and the application of 2D and 3D NMR methods for the determining protein and RNA structures; methods of macromolecular crystallization and crystal structure determination.

Taught every other year - was not offered Spring 2016 or expected Spring 2018

M, W, F 9:40- 10:30, HSEB 5100D

16958	**PHYS 6210**	**Optics in Biology**	**Saffarian**	**3.0**	**Full Semester**

Counts as 2 electives. Prerequisites: "B-" or better in PHYS 2210 AND PHYS 2220

The use of optics in biology has evolved from the simple light microscope used by Darwin to the complex cryo-electron and live cell high resolution microscopes used today. With all these advances it can now be argued that we stand at the dawn of quantitative biology and optics provides an essential tool in this pursuit. This course is designed to give students a good understanding of physics involved in advanced optics while focusing their attention on the biological problems amenable to these techniques. Students with backgrounds in biology, chemistry or physics are equally encouraged however knowing algebra is a requirement for taking this course. Each section of the course would deal specifically with a special kind of microscopy followed with a case study in a biological problem that is most amenable to the use of the techniques discussed.

Not taught every year - was not offered Spring 2016

T, Th 12:25-1:45, LS 111, Class 16958

17039	**PHYS 6231**	**Biological Motors**	**Vershinin**	**2.0**	**01/21 to 03/01/2016**

This course will provide an overview of the structure and biological function of microtubule and actin-based motors (including topics of motor regulation,). Students with back grounds in biology or physics are equally encouraged. The class will outline the biological context of motor activity, discuss motor families and details of their mechano-chemical activity as well as related advanced topics.

Cross-listed with PHYS 6230 which is a full term course.

Conflicts with First Year Lit Review and Grant Prep T, Th 3:00-5:00

T, Th 2:00-3:20, WBB 617, Class 14674

7207	**PHCEU 7095**	**Molecular Modeling**	**Cheatham**	**2.0**	**Full Semester**

This survey course, including a hands-on component, will cover computational and simulation methods for understanding the structure, dynamics and interactions of biological molecules with an emphasis on topics relevant to therapeutic design, delivery and disposition. Possible topics will include molecular modeling, atomistic simulation, molecular docking, drug design, ADME, homology modeling, high performance computing, and protein structure prediction. We will first review fundamental principles of molecular interaction and then survey various modeling approaches to highlight their ranges of applicability and limitations. Experience with computers is desirable for the laboratory component.

Cross-listed with PHCEU 7095

Not Offered Spring 2017