Fall 2023 Graduate Course Electives

Note - This is not a full comprehensive list. Courses such as advanced journal clubs and departmental Research in Progress are not included.

Always check your Department guidelines and with your department coordinator, thesis advisor, and the course instructor for permission and guidance.

Classroom assignments may change between the time you register and when classes begin. Please check your class schedule for the latest classroom location information before attending class.

Fall 2023 Class Schedule: https://student.apps.utah.edu/uofu/stu/ClassSchedules/main/1238/index.html

Fall 2023 Selectives

All first year students will self-select two (2) selectives courses that match their research interest and/or explore the range of disciplines and research emphasis areas.

- All Selectives will be held during Second Half Semester
- Please note some classes overlap in days/times.
- Contact the Instructor or Department Coordinator to confirm if advanced students can enroll along with first year students and if a permission code is required
- Selectives will be 1.5-3 credits each

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15574	**ANAT 6400**	1.5	Fundamentals in Cellular and Molecular Neuroscience	Jason Shepherd	M, W	9:00AM - 10:30AM	BPRB 501
Fall 2023 Selective *Second Half Semester* *Lecture*		The nervous system is the most complex organ in the body; behavior requires unique cell biology and biochemistry. The goal of this course will be to introduce core cellular and molecular processes in the main brain cell types; neurons and glia. In addition, we will highlight how these processes can go awry in neurological disorders. Topics covered include: Cellular and molecular composition of the nervous system The molecular basis for synaptic transmission – the conversion of electrical activity by chemical synapses. How synapses form circuits during development and learning How synapses signal to the nucleus to regulate gene expression The role of glia (microglia and astrocytes) in brain function. Molecular basis of common neurological disorders New advanced methods to study the brain – optogenetics, human pluripotent stem cells, organoids				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9990	**ANAT 7750**	1.5	Developmental Neurobiology	Michael Deans	T, Th, F	10:45AM-11:35AM	EHSEB 3515B
Second Half Semester *Lecture*		Cellular and molecular biology of nervous system development. *Meets With* • *NEUSC 7750 001*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
10656	**ANAT 7770**	2.0	Neural Regulation of Metabolism	Owen Chan	T, Th	10:45AM-11:35AM	M LI 1160
Full Semester *Lecture*		This course is intended to be a graduate level course that provides a detailed overview of the central mechanisms that regulate peripheral metabolism and feeding. Topics to be covered include neural circuits involved in the regulation of brain glucose sensing, hypothalamic control of energy balance, the hypothalamic melanocortin system, mesolimbic reward system as well as central connections with liver and adipose tissue and brain energetics. These topics will be discussed in the context of both normal functionality and in the pathophysiology of diseases such as obesity and diabetes.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13541	**ANAT 7790**	1.5	Light Microscopy and Digital Imaging	Adam Douglass & Kristen Kwan	T, Th	9:00AM-10:00AM	EHSEB 2948
Full Semester *Special Projects*		Covers theory and practice of biological light microscopy, including sample preparation and staining, fluorescence and confocal microscopy, digital image analysis and quantitation, and figure preparation. A class project uses data from students' own research. *Meets With* • *NEUSC 7790 001*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15735	**BIO C 6420**	1.5	Biophysical Methods	Michael Kay & Wes Sundquist	T, Th	2:30PM - 3:50PM	EHSEB 5100C

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Fall 2023 Selective *Second Half Semester* *Lecture*		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.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15798	**BIO C 6430**	1.5	Structural Methods	Julia Brasch, Erhu Cao, Chris Hill, & Peter Shen	M, W, F	2:00PM - 2:50PM	BPRB 501
Fall 2023 Selective *Second Half Semester* *Lecture*		This course provides an integrated approach to the applications of X-ray crystallography and electron microscopy in structural biology. Topics covered include basic theory and the application of methods of structure determination.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15421	**BIO C 6600**	1.5	Regulation of Metabolism	Keren Hilgendorf & Janet Lindsley	T, Th	9:30AM - 11:00AM	EHSEB 2600
Fall 2023 Selective *Second Half Semester* *Lecture*		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.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13755	**BIOL 5275**	4.0	Microbial Diversity, Genomics and Evolution	Colin Dale	Various	Various	Various
Full Semester *Lecture*		Microbial Diversity, Genomics and Evolution (MDGE) examines the role of microorganisms and their complex interactions with other living organisms and the environment. The lecture course provides an integrated vision of genome biology and microbial physiology, diversity and ecology and serves as a primer for all students interested in genomics. The integrated laboratory class provides students with an opportunity to collect samples from the environment and examines microbial diversity using modern molecular biological methods and bioinformatic tools. *Prerequisites: "C-" or better in ((BIOL 1620 OR BIOL 2010) AND BIOL 2030).* ***Differential tuition for 5000 level BIOL class that will not be covered by Tuition Benefit.***					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
Multiple Sections	**BIOL 5425**	4.0	Mycology	Bryn Dentinger	Various	Various	Various
Full Semester *Lecture*		From mushrooms to molds, this course will provide an overview of the enormously diverse Kingdom Fungi, with an emphasis on their ecology and evolution. Through lectures and labs, this course will use a phylogenetic framework to introduce the major groups of fungi, demonstrate how to recognize and document them, and discuss their significance to the environment and human society. The lab will include a field excursion followed by molecular identification of collected samples using DNA sequencing and phylogenetic analysis. *Prerequisites: "C-" or better in (BIOL 1620 OR BIOL 2010).* ***Differential tuition for 5000 level BIOL class that will not be covered by Tuition Benefit.***					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15441	**BIOL 5510**	3.0	Genes, Development, and Evolution	Michael Shapiro	T, Th	10:45AM-12:05PM	JTB 120
Full Semester *Lecture*		Understanding the molecular basis of evolutionary change is a fundamental challenge in biology. This course focuses on recent scientific literature in genetics and developmental biology to explore the mechanisms that impact evolutionary change. Topics concentrate on animal biology and include the molecular basis of diversity in body plans, limb development and evolution, genetics of pigmentation differences, and variation in other adaptive traits. We will also address how humans have shaped animal diversity through domestication. In some cases, the genes that control normal variation among species are also involved in human disease; therefore, studying the molecular mechanisms of diversity promises a greater understanding of human health. It is recommended (but not required) that BIOL 2030 is taken concurrently or completed prior to taking this course. *Prerequisites: 'C-' or better in BIOL 1210 OR BIOL 1610 OR AP Biology score of 4+ OR IB Biology score of 5+.*					
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Updated 9/1/2023

Fall 2023 Graduate Course Electives

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15581	**BIOL 6120**	2.0	Computing with Python	David Goldenberg	T, Th	10:45AM-11:35AM	BIOL 150
Full Semester *Lecture*	This course is intended to provide an introduction to computer programming, using the Python language and highlighting applications in biology. The course is intended primarily for first year graduate students in the School of Biological Sciences, but others are welcome. No prior programming experience is required. In addition to an introduction to the Python language, the course includes a bit of history, a general overview of modern computing and the use of Unix-type operating systems (including MacOS and Linux). The course structure will include lectures, in-class computing exercises, homework exercises and a project to completed during the last three weeks of the term.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15583	**BIOL 6140**	1.5	Advanced Genetics	Kent Golic, Kelly Hughes, & Erik Jorgensen	M, W, F	10:45AM - 11:35AM	CSC 25
Fall 2023 Selective *Second Half Semester* *Lecture*	Advanced Genetics covers the fundamentals of classical genetics and genetic analysis in prokaryotes and eukaryotes. Classical genetics encompasses the mechanisms of inheritance and the behavior of genes and chromosomes in somatic cells and germ cells. Genetic analysis is a branch of biological investigation that uses mutations and mutant phenotypes to study the function and behavior of cells and groups of cells, in isolation and in a developmental context. Prokaryotes and eukaryotes have different modes of inheritance and significant differences in gene regulation and in their cellular biology. Prokaryotes provided the foundational discoveries of molecular biology and continue to be a source of new genetic tools and biological understanding with health and ecological relevance. Modern eukaryotic genetics blends the tools of molecular biology, cell biology and classical genetics to investigate gene and cell function in complex organisms.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12158	**BIOL 7961**	1.0	Advanced Topics in Biochemistry and Molecular Biology	Michael Werner	M / Th	3:30PM-4:30PM / 9:30AM-10:30AM	CSC 25 / BIOL 306
First Half Semester *Special Topics*	Topics of special interest taught when justified by student and faculty interest. Content varies from year to year.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
18677	**CHEM 6740**	2.0	Bioanalytical Chemistry	Jennifer-Shumaker-Parry	T, Th	10:45AM-12:05PM	CSC 25
Fall 2023 Selective *Second Half Semester* *Lecture*	This course is intended to provide an overview of the methods of chemical analysis used to characterize biological samples. Topics will include a discussion of separations techniques, the spectroscopy of biological molecules, immunological and enzymatic assays, and surface analytical methods.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
1711	**CHEM 7040**	2.0	Statistical Thermodynamics	Michael Gruenwald	M, W, F	11:00AM-12:05PM	HEB 2010
First Half Semester *Lecture*	This course introduces the statistical machinery used to connect molecular behavior with thermodynamic principles. Covered topics are useful for chemists, physicists, biologists, and engineers.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19176	**CHEM 7050**	2.0	Classical Thermodynamics	Valeria Molinero	M, W, F	8:35AM-9:35AM	HEB 2010
Second Half Semester *Lecture*	This course covers classic topics of thermodynamics, including phase and chemical equilibria, solutions, and electrochemistry. Students will learn to derive and understand fundamental thermodynamic relations, equations, and formulae and explore their importance in modern applications. The material covered in this course is useful for scientists and engineers with a thorough understanding of undergraduate thermodynamics.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
1713	**CHEM 7240**	2.0	Physical Organic Chemistry	Aaron Puri	T, Th	9:10AM-10:30AM	HEB 2002
First Half Semester *Lecture*	Physical organic chemistry studies the approaches to deciphering the mechanisms of organic reactions and the principles that govern host-guest binding. The topics include stereochemistry, conformational analysis, thermochemistry, acidity, tools to decipher reaction mechanisms, rate laws, kinetic isotope effects, linear free energy relationships. *Meets With* • *CHEM 5240 001*						
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Updated 9/1/2023

Fall 2023 Graduate Course Electives

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1716	**CHEM 7250**	2.0	Organic Reaction Mechanisms	Ryan Looper	M, W, F	9:35AM-10:40AM	CSC 25
Second Half Semester *Lecture*		Course examines organic reaction mechanisms involving all fundamental reaction types. Included will be complex mechanisms as combinations of fundamental steps, orbital symmetry controlled reactions (with Woodward-Hoffman, Fukul, and Zimmerman treatments), trajectory analysis and radical reactions. *Meets With* • *CHEM 5250 001*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15881	**CHEM 7270**	2.0	Organic Spectroscopy I	Beth Buck-Koehntop	M, W, F	11:00AM-12:05PM	HEB 2010
Second Half Semester *Lecture*		Topics covered include: Solution NMR theory; experimental set-up and data acquisition; chemical shifts; J-coupling; NMR relaxation; NOE; advanced 1D and 2D NMR techniques; spectral interpretation/identification of organic molecules from 1D and 2D solution NMR spectra.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11731	**CHEM 7430**	2.0	Chemical Biology of Proteins	Ming Hammond	T, Th	9:10AM - 10:30AM	HEB 2002
Fall 2023 Selective *Second Half Semester* *Lecture*		This is a one half semester course that focuses on the application of organic chemistry to the study and manipulation of proteins. Topics include chemical synthesis of peptides, proteins, and peptide mimics and chemical biology methods to study the role of proteins in cell biology and signaling. Prerequisite: 2 semesters undergraduate organic chemistry.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11441	**CHEM 7730**	2.0	Fundamentals of Electrochemistry	Shelley Minteer & Henry White	M, W, F	9:35AM-10:40AM	MEB 2325
First Half Semester *Lecture*		This course will provide an overview of the fundamental concepts of electrochemical science. The course is devoted to the basic principles underlying chemical reactions at the electrode/electrolyte interface.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12373	**CHEM 7740**	2.0	Techniques and Applications of Electrochemistry	Shelley Minteer & Henry White	T, Th	9:10AM-10:30AM	HEB 2010
Second Half Semester *Lecture*		This course is designed to introduce you to electrochemical reaction mechanisms, electroanalytical techniques, and electrochemical technologies. Topics to be covered include: a variety of voltammetric and amperometric techniques, electrochemical reaction mechanisms and modified electrodes, and modern electrochemical technologies.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11732	**CHEM 7770**	2.0	Analytical Spectroscopy and Optics	John Conboy	T, Th	9:10AM-10:30AM	HEB 2010
First Half Semester *Lecture*		Three lectures, one discussion per week for 7.5 weeks. This course provides an overview of the principles of optical spectroscopy covering the following topics: Basic optics, such as light propagation, polarization, Fresnel's equations, and elementary optics. Mechanics of optical spectroscopy, including light sources, wavelength selection, and dectors. Sensitivity and dynamic range in spectroscopic measurements. Advanced topics in absorbance, fluorescence and vibrational (IR and Raman) spectroscopy. Surface spectroscopic methods based on optical waveguides, total internal reflection, and surface plasmon resonance. Nonlinear optical spectroscopes, including second-harmonic generation and sum-frequency generation.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16858	**COMP 5960**	3.0	Applied Data Visualization	Alexander Lex	M, W	3:00PM-4:20PM	JFB B-1
Full Semester *Special Topics*		This course introduces the principles, methods, and techniques for effective applied data visualization. The course balances teaching fundamental aspects of data visualization (perception, design, visualization techniques, etc.) and practical hands-on skills, such as how to create figures (e.g., for papers or publications) and interactive visualizations in visualization tools and in computational notebooks. *Pre-requisite: Programming and scripting knowledge at the level of COMP 1020.*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
6655	**H GEN 6030**	2.0	Special Topics in Genetics	Mark Metzstein	TBD	TBD	TBD
Full Semester		Seminar for Human Genetics graduate students covering current topics in the scientific literature.					

Updated 9/1/2023

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Seminar							
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
20788	**H GEN 6490**	2.0	An Introduction to Techniques and Applications	Robert Weiss	T, TH	11:15AM - 12:30PM	EHSEB 5100B
Fall 2023 Selective *Second Half Semester* *Lecture*		This half-semester course explores the development and application of DNA/RNA sequencing technology, with a specific focus on genomics and transcriptomics. The main goal of this course is to introduce students to the technical aspects and underlying principles used in high-throughput 'omic' approaches. In addition to gaining know-how about these methods, including single-molecule and single-cell techniques, students will learn how omics data can be generated and analyzed to comprehend functional elements of genomes.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
8060	**H GEN 7380**	3.0	Biochemical Genetics	Nicola Longo & Marzia Pasquali	M / W	3:30PM-5:30PM / 4:30PM-5:30PM	EHSEB 3515B
Full Semester *Lecture*		This course will educate physicians and graduate students on the fundamentals of biochemical genetics. Includes inborn errors of metabolism and several common disorders, such as diabetes and hypertension, which have biochemical bases correctable by diet or other medical intervention. Provides overview of biochemical pathways, practical experience on how the biochemical pathways can be studied in vivo and in vitro, the molecular bases of common metabolic problems, the mechanism of inheritance including recurrence risk, and how to rationally treat metabolic blocks. *Prerequisite: College level biochemistry.*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19246	**MDCRC 6450**	3.0	Grant Writing	Anthea Letsou	T	5:00PM-7:00PM	EHSEB 5100C
Full Semester *Lecture*		This course covers the entire preparation of an NIH grant, including aims and hypotheses, significance and innovation and research plan, bio sketches, and supporting appendices. Students will write a grant using the NIH format and critique classmates' grants using the NIH CSR review templates. Note: Students should ideally be in the process of writing a health-related research grant during the semester-long course. *Prerequisites: MDCRC 6000, 6010, and 6430.*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19842	**MDCRC 6521**	2.0	Medicine & Physiology for Molecular Biologists	Kevin Whitehead	T, Th	9:10AM-10:30AM	EHSEB TBA
Full Semester *Special Topics*		This course explores and provides a richer understanding of human physiology and pathophysiology. This information is critical for understanding the importance of any molecular mechanism at the level of cells, organ and whole animals, and applying this information to humans. **This course has a DIFFERENTIAL TUITION attached to it that is NOT covered by the Tuition Benefit Program.**					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
5553 / 13473	**MBIOL 7570**	1.0	Case Studies and Research Ethics	Joyce Havstad	W	4:00PM-5:20PM	GC 2900 / CTIHB 101
First Half Semester / Second Half Semester *Lecture*		An examination of research integrity and other ethical issues involved in scientific research. Topics may include scientific fraud, conflicts of interest, plagiarism and authorship designation, and the role of science in formulating social policy. This course is designed for graduate students, post-docs and regular faculty in the sciences. *Meets With* • *PHIL 7570 001* • *PHIL 7570 002*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19904	**ONCSC 6500-001**	1.5	Clinical Biology of Cancer	Allie Grossmann & Rob Judson-Torres	M, W, F	3:00PM - 3:50PM	HCI Research South 6th floor Conference Room
Second Half Semester *Lecture*		In alternating years, this course is focused on the current understanding of the molecular and cellular biology of cancer along with how this knowledge relates to the diagnosis, treatment and prevention of cancer. The complementary sister-course is focused on clinical cancer biology. It is designed for graduate students and post-doctoral fellows in basic science departments with an interest in modern principles and practice of oncology. It will cover general principles and new developments in cancer etiology, detection, diagnosis, treatment, and prevention. The course is organized around specific diseases, using advances in each area to highlight modern principles and practice of oncology.					

Updated 9/1/2023

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15486	**ONCSC 6500-002**	1.5	Clinical and Molecular Cancer Biology	Sean Tavtigian	M, W, F	3:00PM - 3:50PM	HCI - South Auditorium
Fall 2023 Selective *Second Half Semester* *Lecture*		Offered as a Fall Selective, this course is focused on the current understanding of the genetics, molecular, and cellular biology of cancer along with how this knowledge relates to cancer diagnosis, treatment, and prevention. The course alternates didactic lectures with student-driven presentations on notable publications that were important to a topic covered in a prior lecture. The complementary sister-course is focused on clinical cancer biology. It is designed for graduate students and post-doctoral fellows in basic science departments with an interest in modern principles and practice of oncology. It will cover general principles and new developments in cancer etiology, detection, diagnosis, treatment, and prevention. The course is organized around specific diseases, using advances in each area to highlight modern principles and practice of oncology.					

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19826	**ONCSC 6700**	1.5	Seminars in Cell and Molecular Biology	Jaime Fornetti & Alana Welm	T	1:00PM-3:00PM	HCI - South 2C Conference Room
Second Half Semester *Special Topics*		This course will be on Thursdays from 1:00 to 3:00 pm in the Huntsman Cancer Institute Research South 2C Conference Room. Prerequisite: This course is designed for graduate students that have completed their first year Tumor development and progression are shaped by both tumor-intrinsic and -extrinsic factors. While the importance of the interaction between tumor cells and the host microenvironment was first proposed over a century ago, advances in technology and our understanding of the tumor microenvironment have led to an increasing appreciation for the role of the host in cancer progression. This course will focus on the contribution of both the cellular and non-cellular components of the tumor microenvironment to tumor progression and response to therapy, including – but not limited to – stromal cells, immune cells, and the extracellular matrix. This is an Advanced Seminar course and will utilize the primary literature as a basis for student presentations and critical discussion.					

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17052	**ONCSC 7700**	1.0	Cell Biology	Matthew Miller & Ben Myers	T, Th	2:30PM - 4:00PM	EHSEB 4100B
Fall 2023 Selective *Second Half Semester* *Lecture*		This course covers basic and advanced topics related to cell structure and function including cytoskeleton, membrane trafficking, protein targeting/modification and degradation, cell cycle regulation, and signal transduction.					

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15716	**PATH 6500**	1.0 - 2.0	Immunity, Inflammation and Infectious Disease	June Round	M, W	1:30PM - 2:50PM	EHSEB 5100C
Fall 2023 Selective *Second Half Semester* *Lecture*		The immune system is an integral part of virtually every organ system of the body including the neuronal, digestive, cardiovascular and endocrine, to name just a few. Moreover, while the immune system is fundamental to our ability to fend off infectious pathogens, it is intimately involved in a variety of diseases that plague the modern world including all cancers, behavioral diseases, and autoimmunity. Studies in immunology have led revolutionary discoveries that have fundamentally transformed human health, such as protection from deadly pathogens through vaccination and reversal of cancers through immune-based therapies. Thus, an understanding of basic immunological concepts is broadly applicable in multiple disease settings. Furthermore, the immune system provides an effective platform for understanding fundamental concepts of cellular and molecular biology, including events controlling cellular development, differentiation and function, DNA recombination and repair, and cell signaling. This course was designed to introduce basic immunology while integrating and helping to solidify cell biology, genetic and molecular biology concepts. This course will allow you to address questions such as: How does the immune system detect and respond to microbes? How does immunity elicit protection from microbes? Why doesn't the immune system react to self tissue? How do cells of the immune system differentiate and make fate decisions in response to external stimuli? What are the mechanisms used by the immune system to recognize such a diversity of microbes? How is the immune system used to fight cancer? Why don't we generally get sick twice with the same pathogen? Undergraduate exposure to basic principles of cell biology, genetics, and molecular biology will improve understanding of this course.					

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
4665	**PATH 7330**	3.0	Basic Immunology	Hans Haecker	T, Th	2:00PM-3:30PM	EHSEB 3515B
Full Semester *Lecture*		This is a survey course covering the basic principles in Immunology with lectures provided by faculty directly involved in particular areas. The final third of the course will feature clinical and experimental topics in Immunology. The course is primarily slated for graduate and master students. It is also open for particularly interested undergrad students, but is not specifically intended as preparation for Med School due to its programmatic depth. Students should have some exposure to biochemistry, modern genetics, and cell biology. It meets the requirements for the Medical Technology (B.S.) and Medical Laboratory Science (M.S.) programs. Undergrad students are encouraged to complete BIOL 2020, 2030 and 3510 prior to taking this course. *Meets With* • *PATH 5030 001*					

Updated 9/1/2023

Fall 2023 Graduate Course Electives

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15847	**PHARM 6500**	2.0	Therapeutics Discovery, Development, and Evaluation	Raphael Franzini & Mei Koh	M, W, F	11:10AM - 12:00PM	EHSEB 4100C
Fall 2023 Selective *Second Half Semester* *Lecture*		This half-semester course, which is open to graduate students from departments in the College of Pharmacy and those participating in the Biological Chemistry/Molecular Biology PhD programs, will explore the process of developing therapeutics. Subject matters include steps spanning the entire drug development process from discovering active species, developing them into compounds that are suitable for clinical evaluation, assessing pharmacokinetics and pharmacodynamics, and determining the efficacy of candidates in clinical studies and after FDA approval.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9451	**PHCEU 7010**	1.5	Molecular Biology for Pharmaceutical Scientists	Katherine Bowman & Lim Carol	M, W	11:00AM-12:30PM	EHSEB 2600
Second Half Semester *Lecture*		This course will review fundamental aspects of genetic engineering and molecular biology, with application to health sciences. *Prerequisite: Graduate Standing Required.*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
7516	**PHCEU 7030**	2.0	Macromolecular Therapeutics and Drug Delivery	You Han H. Bae & Shreya Goel	T, Th	8:50AM-10:50AM	EHSEB 5100C
First Half Semester *Lecture*		Introduction to polymer in Pharmaceutics and drug delivery. Transport phenomena in drug delivery systems. Macromolecular and vesicular carriers. Biorecognition and drug targeting. Protein, oligonucleotide, and gene delivery systems. *Prerequisite: Graduate student status or instructor consent and CHEM 7050.*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12981	**PHCEU 7040**	3.0	Biotechnology	James Herron & Shawn Owen	M, W, F	10:00AM-12:00PM	EHSEB 5100B
First Half Semester *Lecture*		Principles of kinetics and mechanisms of organic reactions and structure-reactivity relationships applied to pharmaceutical systems. Mechanisms of the degradation and stabilization of drugs, proteins, and DNA. *Prerequisite: Graduate student status or instructor consent and one differential equations course.*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11711	**PH TX 7113**	3.0	Essentials of Pharmacology and Drug Development	Louis Barrows & Gabriel Bosse	T, Th	1:30PM-3:00PM	117 Skaggs Hall Conference Room
Full Semester *Lecture*		This course is designed to provide basic didactic information in the underlying concepts of pharmacology for the beginning graduate student. The primary emphasis of the course is to provide new graduate students in the Department of Pharmacology and Toxicology, or other graduate students in the biomedical sciences (Neuroscience, Biological Chemistry, or Molecular Biology programs) with fundamental knowledge about pharmacology and drug treatment. It is anticipated that students who complete this course would be able to apply these fundamental concepts to more advanced curricula and research endeavors in the disciplines of pharmacology and toxicology.					

Updated 9/1/2023