Fall 2024 Graduate 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 2024 Class Schedule: https://student.apps.utah.edu/uofu/stu/ClassSchedules/main/1248/index.html

Fall 2024 Selectives (Please see pages 6-7)
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
9486	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
10091	ANAT 7770	2.0	Neural Regulation of Metabolism	Owen Chan	T, Th	10:45AM-11:35AM	TBA
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
12779	BIOL 5275	4.0	Microbial Diversity, Genomics and Evolution	Colin Dale	M, W	2:00PM-2:50PM 3:05PM-5:00PM 3:05PM-5:00PM	JTB 320 JTB 340 JTB 345
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. *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. *Sections 002 - 003 belong to this lecture. This course requires registration for a lab section. Students will be automatically registered for this lecture section when registering for the pertinent lab section.* *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.*					

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14011	BIOL 5510	3.0	Genes, Development, and Evolution	Michael D Shapiro	T, Th	10:45AM – 12:05PM	AEB 310
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+.* *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
14097	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
11436	BIOL 7961	1.0	Advanced Topics in Biochemistry and Molecular Biology	JS Parkinson	M, Th	3:30PM-4:30PM (M) 9:30AM-10:30AM (TH)	CSC 13
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
16898	BIO C 7100	1.0-2.0	Topics in Biochemistry	Peter Shen	TBA	TBA	TBA
First Half Semester *Special Topics*		Seminar: Student and faculty discussion of advanced-level topics not covered in formal courses.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
1667	CHEM 7040	2.0	Statistical Thermodynamics	Ryan Steele	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
16382	CHEM 7050	2.0	Classical Thermodynamics	Valeria Molinero	M, W, F	8:20AM – 9:25AM	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
1669	CHEM 7240	2.0	Physical Organic Chemistry	Jacob Lessard	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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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
1672	CHEM 7250	2.0	Organic Reaction Mechanisms	Ryan Looper	M, W, F	11:00AM – 12:05PM	HEB 2010
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
14296	CHEM 7270	2.0	Organic Spectroscopy I	Bethany Buck-Blanco	M, W, F	9:35AM-10:35AM	CSC 25
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. *Meets With CHEM 5270 001*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
6234	CHEM 7460	2.0	Protein Chemistry	Vahe Bandarian	M, W, F	8:20AM-09:25AM	JTB 120
First Half Semester *Lecture*		This is a one half semester course which focuses on the mechanisms of chemical reactions involving peptides and proteins and methods for their study. Subject matter includes enzyme mechanisms, chemical modification of proteins and cofactor chemistry. Prerequisite: organic chemistry. *Meets With CHEM 5460 001*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14730	CHEM 7640	2.0	Materials Chemistry for Alternative Energy	Ming Lee Tang	M, W, F	11:00AM – 12:05PM	HEB 2002
Second Half Semester *Lecture*		This course is designed to introduce you to the fundamentals of materials approaches to alternative energy. Topic to be covered include materials for: electrofuels, solar, fuel cells, batteries chemistry and engineering of electrodes used for each type of energy production, conversion, or storage, as well as fundamental understanding of energy sources, including their advantages and limitations. *Meets With CHEM 5640 001*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13043	CHEM 7725	2.0	Mass Spectrometry	Gabe Nagy	M, W, F	8:20AM-9:25AM	CSC 10-12
Second Half Semester *Lecture*		This one-half semester course will cover material related to the instrumentation, fundamentals, and applications of mass spectrometry. Topics will include a discussion of mass spectrometry nomenclature, ionization sources, mass analyzers, and detectors. Prerequisite: quantitative analysis.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
10792	CHEM 7730	2.0	Fundamentals of Electrochemistry	Henry White	M, W, F	9:35AM – 10:40AM	PAB 103
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
21395	CHEM 7740	2.0	Techniques and Applications of Electrochemistry	Long Luo	M, W, F	9:35AM – 10:40AM	TBBC 2429
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.					

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11049	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
21205	COMP 6960-009	3.0	Programming for BioMedical Data Science	Rebecca Barter & Jeff Phillips	Online	Online	Online
Online *Special Topics*		This course will provide an introduction to programming, in R and/or python, with topics and pace designed for biomedical students interested in data science. Prior programming experience is not required. Students will learn how to write code for handling data, focusing on dataframe representations. Using these common representations, students will learn to prepare data for analysis starting from various formats, visualize its contents, and perform basic analysis to evaluate the data veracity. This course is structured as a series of stackable short-courses, where students need to select and complete 4 short courses in the semester to fulfill requirements for this credit-earning course					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
5329	MBIOL 7570	1.0	Research Ethics	Joyce Havstad	W	4:00PM - 5:20PM	GC 2900
First 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*					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
7982	MDCRC 6000	2.0	Introduction to Biostatistics	Greg Stoddard	Online	Online	Online
Online *Lecture*		Basic statistics with emphasis on medical and epidemiologic research problems, including description of data, theoretical distributions, hypothesis testing, multiple comparisons, correlation, confidence intervals, basic regression models, and sample size estimation.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14431	MDCRC 6050	2.0	Biostatistics for Basic Science	Greg Stoddard	Online	Online	Online
Online *Lecture*		Applied statistical methods in basic science. Problems will be solved using the Stata statistical software. Topics include: descriptive statistics, significance testing, multiple comparison adjustment, data management using Stata, computer graphics, sample size determination, and analysis of clustered data (multiple observations in same animal). Animal and bench experiment datasets will be used in lectures and homework.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16439	MDCRC 6450	3.0	Grant Writing	Anthea Letsou & Julie Shakib	T	5:00PM – 7:00PM	EHSEB 2948
Full Semester *Lecture*		This course covers the preparation of a research grant application including Abstract, Aims, Significance, Innovation, Research Plan, and Biosketch, as well as supporting appendices. Over the course of the semester, students will complete a grant application (usually in the NIH format). The course concludes with a mock study section. Enrolled students should be in the process of writing a research grant with a planned submission in the next 12 months.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16867	MDCRC 6521	1.0-5.0	Medicine & Physiology for Molecular Biologists	Kevin J Whitehead	T, Th	9:10AM-10:30AM	EHSEB 2908
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
21054	ONCSC 6700-002	1.5	Signaling Concepts in Cancer	Joshua Andersen & Michelle Mendoza	M, W	9:00AM-10:30AM	Room HCI Research

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							South-5C
Second Half Semester *Special Topics*		This advanced graduate course will cover a range of fundamental and emerging concepts in cell signaling, including post-translational modifications, protein-protein interaction domains, small GTPases, kinase/phosphatase and ion channel signaling, steroid and membrane receptor signaling, and protein phase separation as an organizing principle for signal transduction. Instructors will give introductory lectures on key topics and students will read and present classic and new literature in each topic area. The class will rely heavily on group discussion and critical analysis of the literature. Course goals: Students will deepen their mechanistic understanding of core and emerging concepts in cell signaling. Students will sharpen their ability to pinpoint important knowledge gaps and understand how they can be addressed with experimental techniques. Students will improve their ability to read and critically analyze the scientific literature. This includes understanding the stepwise logic of experimental design.				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
4515	PATH 7330	3.0	Basic Immunology	Maria Bettini	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.				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19331	PH TX 7114	2.0	Principles of Toxicology	Alessandro Venosa	T	1:30PM - 3:30PM	SRB 3290
Full Semester *Lecture*		General principles, testing procedures, toxic responses, and target organ toxicities. This course is designed to familiarize students with adverse effects that chemicals may produce based on the dose, exposure and hazard of those chemicals. There will be a focus on mechanisms of toxicity in different organ systems (Neurotoxicology, cardiovascular, lungs, skin and kidney toxicology) that are relevant based on common exposure. The course will also cover environmental toxicology, toxic effects of pesticides, and natural products.				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
8993	PHCEU 7010	1.5	Molecular Biology for Pharmaceutical Scientists	Carol Lim	M, W	11:00AM - 12:30PM	EHSEB 5100B
Second Half Semester *Lecture*		This course will review fundamental aspects of genetic engineering and molecular biology, with application to health sciences.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
7166	PHCEU 7030	2.0	Macromolecular Therapeutics and Drug Delivery	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
12123	PHCEU 7040	3.0	Biotechnology	James Herron, Yue Lu & 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.					

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14094	**ANAT 6400**	1.5	Fundamentals in Cellular and Molecular Neuroscience	Jason Shepherd	M, W	9:00AM - 10:30AM	BPRB 501
		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
14206	**BIO C 6420**	1.5	Biophysical Methods	Michael Kay & Wesley Sundquist	T, TH	2:30PM – 3:50PM	EHSEB 2958
		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
14245	**BIO C 6430**	1.5	Structural Methods	Julia Brasch, Erhu Cao, Chris Hill, & Peter Shen	M, W, F	2:00PM - 2:50PM	BPRB 501
		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
13996	**BIO C 6600**	1.5	Regulation of Metabolism	Greg Ducker & Keren Hilgendorf	T, Th	9:30AM - 11:00AM	EHSEB 2600
		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
14099	**BIOL 6140**	1.5	Advanced Genetics	Kent Golic, Kelly Hughes, & Matt Rich	M, W, F	10:45AM - 11:35AM	CSC 25
		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
15927	**CHEM 6740**	2.0	Bioanalytical Chemistry	Jennifer Shumaker-Parry	T, Th	10:45AM-12:05PM	CSC 25
		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
11048	**CHEM 7430**	2.0	Chemical Biology of Proteins	Ming Hammond	T, Th	9:10AM - 10:30AM	HEB 2010
		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.				

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17664	**H GEN 6490**	2.0	Introduction to Omics: Applications to Research	Charlie Murtaugh & Robert Weiss	T, TH	11:10AM - 12:30PM	EHSEB 5100B
		Upon completion of this course, students will: • Understand the scope of omics research and methods in genomics, epigenomics, transcriptomics, proteomics, and metabolomics. • Understand omics in terms of investigation for biological questions. • Learn about the importance of experimental design in omics research. • Understand the challenges and limitations of big data analysis, including integration of data, batching, computational resources, and working with collaborators across all fields.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14042	**ONCSC 6500-002**	1.5	Molecular Mechanisms of Cancer	Sean Tavtigian	M, W, F	1:00PM - 1:50PM	HCI - South Auditorium
		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
17084 / 17082	**ONCSC 6701/ BIO C 6701**	2.0	Cell Biology	Matthew Miller & Ben Myers	T, Th	2:30PM - 4:00PM	EHSEB 4100B
		Cell biology was redesigned in 2019 with a decreased emphasis on didactic lectures and a stronger focus on teaching students how to read and evaluate primary literature. The course consists of primary research articles within the field, and each class will discuss one paper. Students will be expected to read/watch background material posted on Canvas prior to each class. Objectives are as follows: 1. To effectively assess data in published literature. To be able to answer: a. What are the questions the authors seek to answer? b. What approaches did the authors use to answer the questions? Why did they use those approaches? c. Did the presented data answer the questions? How convinced are you? d. If you had access to unlimited resources, how would you follow up on this work? What questions would you ask, and how would you answer them? 2. To be able to articulate scientific knowledge both verbally and in written format 3. To gain a basic understanding of selected topics in cell biology					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
21103	**PATH 6500-002**	1.0	Immunity, Inflammation and Infectious Disease	Aaron Petrey, Melissa Reeves, & Arabella Young	M, W	2:00PM – 3:20PM	EHSEB 5100C
		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
14279	**PHARM 6500**	2.0	Therapeutics Discovery, Development, and Evaluation	Raphael Franzini & Mei Koh	M, W, F	11:10AM - 12:00PM	EHSEB 4100C
		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.					