

## Spring 2018 Electives/Advanced Seminars

View Course Schedules online: <https://student.apps.utah.edu/uofu/stu/ClassSchedules/main/1184/>

\*Advanced Course/Seminar, or 1-credit courses: Not available to first-year students unless otherwise noted.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17634	<b>ANAT 7760</b>	3.0	Stem Cell Workshop	Alex Shcheglovitov	T, Th	2:00-3:30	HSEB 3420
Full Semester		The course will begin with a lecture series on the fundamentals of stem cell biology and the use of stem cells, in particular induced-pluripotent stem cells (iPSC), as models for the study of development and disease. Following the lecture series, each student will present a journal article related to a lecture topic, and write the Specific Aims page of a hypothetical grant application based on one of the discussion papers. Lab sessions will provide students with practical hands-on techniques required for reprogramming, culturing, and cryopreserving iPSCs.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17330	<b>BIO C 6420</b>	1.5	Advanced Biochemistry	Michael Kay Wes Sundquist	T, Th	9:40-11:00	HSEB 3420

First Half Semester

***Frequent BC Elective (Biochemistry Research Track Course)***

***Frequent MB Elective***

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
4393	<b>BIO C 6600</b>	1.5	Metabolic Regulation	Janet Lindsley	T, Th	9:30-11:00	HSEB 2908

Second Half Semester

***Frequent BC Elective (Biochemistry Research Track Course)***

***Frequent MB Elective***

Prerequisite: BIOL 3520 or CHEM 3520 or equivalent.

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.

***Note: 9:30-11:00 AM - this class starts 10 minutes earlier than usual class times.***

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
4418	<b>BIO C 7100</b>	1.0	Metabolism	Jared Rutter	TBA	TBA	TBA

Full Semester

Advanced Seminar: Student and faculty discussion of advanced-level topics not covered in formal courses.

Contact Jared Rutter, [rutter@biochem.utah.edu](mailto:rutter@biochem.utah.edu), for course info and permission to register.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9643	<b>BIOL 7962</b>	3.0	Seminal Papers in Biology	Kent Golic	M, W	4:00-5:30	ASB 504

Full Semester

This course focuses on papers that have made significant and lasting contributions to biological understanding, owing to their intellectual elegance, significance of discovery, or technical advancement. Topics vary according to instructors, but may include genetics, cell biology, biochemistry, development and evolution. The course is organized around student presentations and discussion, with guidance and input from Instructors.

The course is intended for graduate students in the biological sciences, but advanced undergraduates may also enroll with permission. The course is organized around directed readings and in-class discussion. There are no exams or writing assignments.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
8016	<b>BIOL 7964</b>	1-5	Advanced Topics in Ecology and Evolution	David Bowling	M, W	3:30-5:30	ASB 304

Full Semester

This course covers a selected set of significant, influential and exciting topics in ecological, evolutionary, organismal and environmental biology. The course will introduce the students to the faculty, how they think and what they think is interesting and exciting. The course also will promote intellectual and social interactions among all members of the EEOB group. There will be assigned readings, but no exams or papers. Grading will be based on attendance and participation.

***Note: First year students need to be registered for 1.5 credits.***

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9173	<b>BMI 6105</b>	3.0	Statistics for Biomedical Informatics	Greg Stoddard	TBA	TBA	Online

**Full Semester** This course covers a range of statistical methods from classical hypothesis testing to more modern computational methods. The emphasis is on application and practice rather than extensive theoretical derivations. Simulation is used to illustrate properties of distributions, tests and methods. Students are expected to have access to a personal computer and the "R" environment for statistics and computation. (Required for all biomedical informatics students.) This course requires a permission code, please contact Bioinformatics at 801-581-4080. This is an online course, which does not meet in-class. For additional information, please visit <http://uonline.utah.edu> or call 585-5959. \$60.00 fee not covered by Tuition Benefit.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
7922	<b>CHEM 6810</b>	3.0	Nanoscience: Where Biology, Chemistry and Physics Intersect	Marc Porter	T, Th	9:10-10:30	LCB 219

**Full Semester** An introduction to the emerging fields of nanoscience and nanotechnology. Concepts from biology, chemistry and physics will be used to explore the special features of phenomena at the nanometer scale, and current developments in the design and construction of nanoscale devices will be discussed.  
*Note: This class will have an additional meeting TBA.*

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17540	<b>CHEM 7070</b>	2.0	Chemical Kinetics	Peter Armentrout	M, W, F	8:20-9:25	HEB 2010

**Second Half Semester** This course provides an introduction into the temporal evolution of chemical reactions including modern theories for unimolecular and bimolecular reactions. Experimental methods for studying chemical kinetics are surveyed. This course covers topics useful for chemists, physicists, biologists, pharmacists, and engineers.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12621	<b>CHEM 7470</b>	2.0	Nucleic Acid Chemistry	Cynthia Burrows	M, W, F	8:20-9:25	HEB 2006

**First Half Semester** *Frequent BC Elective (Biochemistry Research Track Course)*  
*Frequent MB Elective*  
Prerequisite: 2 semesters undergraduate organic chemistry.  
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.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15468	<b>H GEN 6060</b>	2.0	Applied Computational Genomics	Aaron Quinlan	T, Th	9:10-10:30	HSEB 2957

**Full Semester** *Frequent MB and BC Elective*  
Prerequisites: Complete "Learn the Command Line" from codecademy.com.  
This course will provide a comprehensive introduction to fundamental concepts and experimental approaches in the analysis and interpretation of experimental genomics data. It will be structured as a series of lectures covering key concepts and analytical strategies. A diverse range of biological question enabled by modern DNA sequencing technologies will be explored including sequence alignment, the identification of genetic variation, structural variation, and ChIP-seq and RNA-seq analysis. Students will learn and apply the fundamental data formats and analysis strategies that underlie computational genomics research. The primary goal of the course is for students to be grounded in theory and have the ability to conduct independent genomic analyses.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14352	<b>H GEN 6091</b>	1.5	Evolution & Development	Gabrielle Kardon	T, Th	1:15-2:45	HSEB 2938

**Second Half Semester** *Frequent MB Elective*  
This course will explore the molecular, developmental, and genetic mechanisms underlying evolutionary change, with an emphasis on current research in animal biology. Topics include regulatory networks and signaling pathways, modularity, developmental constraints, origin of animals, molecular/developmental origin of diverse body plans and appendages, and genetics of speciation. The class will consist of both lectures and discussions of current literature. Suitable for graduate students at all levels.

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9853	<b>H GEN 6421</b>	1.5	Genetics of Complex Diseases	Lynn Jorde	W	1:30-3:30	HSEB 2969

First Half  
Semester

***Frequent MB Elective***

Course work addresses issues relevant to the identification of genes underlying susceptibility to complex disorders. Subjects covered include advantages and disadvantages of isolates versus large population, utilization of affected sibling pairs, discordant sibling pairs and extended families. Methods taught include traditional case-control association methods and family based methods. Other subjects include locus and allelic heterogeneity, phenotypic heterogeneity, gene-gene and gene-environment interactions and density of polymorphic markers. Cross-listed with MDCRC 6420.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
6760	<b>H GEN 6481</b>	1.5	Cell Biology II	Charles Murtaugh	M, W, F	10:45-11:35	HSEB 3515B

First Half  
Semester

***Frequent MB Elective***

This course will examine the mechanisms of a variety of eukaryotic signal transduction pathways, and explore how these pathways affect the behavior of cells within developing and adult tissues. The material will include readings and discussion of the primary literature, and emphasize experimental techniques and analyses.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
6639	<b>MD CH 7891</b>	2.0	Introduction to Chemical Biology	Amy Barrios Danny Chou	M, W, F	1:00-2:00	HSEB 4100C

First Half  
Semester

***Frequent BC Elective (Chemical Biology / Medicinal Chemistry Research Track Course)***

In this half-semester course, we will introduce key concepts in Chemical Biology with an emphasis on examples from the primary literature. Topics will include chemical and biological compound library development, chemical genetics and target identification, and strategies for the development of chemical probes and therapeutic compounds. Students will leave the class with a working knowledge of the field of Chemical Biology and its relationship to medicinal chemistry and drug development, the ability to analyze the primary literature and to design experiments to test key questions at the interface between chemistry and biology.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
8054	<b>MD CH 7895</b>	2.0	The Chemical Biology of Pain: Opioids and Beyond	Eric Schmidt	M, W, F	1:00-2:00	HSEB 4100C

Second Half  
Semester

***Frequent BC Elective (Chemical Biology / Medicinal Chemistry Research Track Course)***

In this half semester course, we will begin by describing the physiology of pain and the current pain treatments. Subsequently, we will discuss the latest advances in understanding the mechanisms underlying various types of pain and the development of new investigational compounds for pain. We will seek an understanding of how drugs are discovered, developed, and approved using pain as an example.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11314	<b>MDCRC 6420</b>	1.5	Genes & Complex Disease	Lynn Jorde	W	1:30-3:30	HSEB 2969

First Half  
Semester

Course work addresses issues relevant to the identification of genes underlying susceptibility to complex disorders. Subjects covered include advantages and disadvantages of isolates versus large population, utilization of affected sibling pairs, discordant sibling pairs and extended families. Methods taught include traditional case-control association methods and family based methods. Other subjects include locus and allelic heterogeneity, phenotypic heterogeneity, gene-gene and gene-environment interactions and density of polymorphic markers. This course is cross listed with HGEN 6421.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
2452	<b>NEUSC 6050</b>	4.0	Systems Neuroscience: Functioning of the Nervous System	Greg Clark	T, Th F	10:45-12:05 12:55-1:45	HSEB 2948

Full Semester

*(Counts as 2 electives)*

Understanding how the brain works is one of the deepest and most exciting challenges confronting modern science. This course will explore systems-level functioning of the nervous system, beginning with relatively concrete issues of sensory coding and motor control, and expanding into more abstract, but equally important, higher-order phenomena, such as language, cognitive and mood disorders, states of arousal, and experience-dependent modifications of neuronal operations.

This course is cross listed with BIOEN 6430.

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
3674	<b>ONCSC 6500-001</b>	1.5	Clinical and Molecular Cancer Biology	Adam Cohen Alan Welm	M, W, F	3:00-4:00	TBD

Second Half  
Semester

***Frequent MB and BC Elective***

Prerequisites: Concurrent enrollment or equivalent 1st year Cell Biology, Molecular Biology and Genetics.  
In this course, participants will be provided with the clinician's look at cancer: How is the diagnosis made at the level of clinical exam, through imaging modalities and modern molecular tests? What are new developments in treatment modalities available to the surgeon, radiotherapist and oncologist? What are genetic risk factors and how should families be counseled? A number of specific solid tumors and leukemias will be discussed and emphasis will be placed on bench-to bedside efforts. The course is designed for graduate students and post-doctoral fellows in basic science departments with an interest in modern principles and practice of oncology, and complements the Molecular Mechanisms of Cancer course offered in alternating years.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12620	<b>PATH 6910</b>	1.5	Noncoding RNAs and Immune Responses	Ryan O'Connell	T, Th	2:00-3:30	EEJMRB 4420

Full Semester

***Advanced Seminar:*** This course is a mix of faculty lectures and student discussions of primary research papers. Topics are selected from current primary literature sources on subjects relevant to the focus of the class, and these will include different types of long and short noncoding RNAs (e.g. miRNAs and lincRNAs) and how they contribute to inflammatory responses. Classes will be lead by a small team of faculty. Basic knowledge of noncoding RNAs and mammalian immunity will be assumed.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13353	<b>PED 5750</b>	1.5	Genomic Analysis I	Clinton Mason	Th	2:30-3:45	HSEB 1750

Full Semester

Provides comprehensive instruction on the analysis of genomic data. An overview of basic statistics, study design, genomic technologies, and computational software will be provided in addition to current best practices in the analysis of genomic data. Genomic Analysis I will focus on analysis and detection of variants and mutations from next generation sequencing data (whole genome sequencing, whole exome sequencing, and targeted panel sequencing) as well as the analysis of genomic copy number data.

***Note: Conflicts with Lit Review and Grant Prep T Th 3-5***

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
10795	<b>PH TX 6720</b>	1.0	Developments in Neuropharmacology	Karen Wilcox	TBA	TBA	TBA

Full Semester

***Advanced Seminar:*** This course will review current advances in the field of neuropharmacology through weekly discussions of research articles.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16754	<b>PH TX 7280</b>	2.0	Advances in Neuropharm	Karen Wilcox	TH	2:00-4:00	TBD

Full Semester

New developments in neuropharmacology.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11702	<b>PHCEU 6020</b>	3.0	Biomaterials	Michael Yu	T, Th	10:45-12:05	WEB 1248

Full Semester

Chemical, physical, and biological properties of synthetic polymer, metal, and ceramic biomaterials. Relationship between the structure of biomaterials and their interaction with blood, soft, and hard tissue. Mechanical properties, fabrication, and degradation mechanisms, and performance testing of materials in biomedical use.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15471	<b>PHCEU 7011</b>	3.0	Fundamentals of Pharmacokinetics	Shawn Owen	M, W, Th	11:00-11:50	HSEB 2680

Full Semester

***Frequent BC Elective***

Prerequisite: PHCEU 7010, or Special Permission from Instructor.

This course will review fundamental aspects of pharmacokinetics with an emphasis on understanding concepts for compartmental and non-compartmental modeling, physiologic modeling, and modeling of targeted drug delivery systems. The goal of the course is to understand how these techniques can be used to optimize drug delivery. This course is cross listed with PHARM 5121.

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14446	<b>PHCEU 7020</b>	4.0	Physical Chemistry of Biomedical and Drug Delivery	David Grainger	W, Th	2:00-4:00	SRI 2290

Full Semester

Prerequisite: Graduate student status or instructor consent and CHEM 7050.

Physicochemical fundamentals of dosage form design. Molecular thermodynamics approach to establishing principles of solutions, structures of liquids and solids, complexation, ion-solvent interactions, and multiple equilibria of organic solutes. Physicochemical examination of peptides and proteins, and protein structures. Thermodynamics of nucleic acids: temperature effects, cooperativity, and hybridization equilibria. Principles of colloid and interfacial sciences applied to pharmaceutical dosage formulations.

**Note: Conflicts with Lit Review and Grant Prep Th 3-5**

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14447	<b>PHCEU 7040</b>	4.0	Biotechnology	James Herron	M, F	9:40-11:45	SRI 2290

Full Semester

**Frequent BC Elective (Counts as 2 electives)**

Prerequisite: Graduate student status or instructor consent and one differential equations course.

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.

This course is cross listed with SRI 2290.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16746	<b>PHCEU 7210</b>	2.0	Biocompatibility	Henry Kopecek	W	10:45-12:35	HSEB 3420

Full Semester

Biocompatibility of soluble and insoluble (crosslinked) polymers. Biocompatibility of biomaterials used as implants, blood substitutes, and carriers of bioactive molecules. Biorecognition of synthetic macromolecules on cellular and subcellular levels. Biodegradability and immunogenicity of biomaterial

This course is cross listed with BIOEN 7120.