

# Spring 2022 Electives/Advanced Seminars

View Course Schedules online:

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## Frequent MB & BC Electives

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
3476	<b>BIO C 6600</b>	1.5	Regulation of Metabolism	Janet Lindsley	T, TH	9:30AM – 11:00AM	EHSEB 2958
Second Half Semester Lecture	<p><b>Frequent BC Elective (Biochemistry Research Track Course)</b> <b>Frequent MB Elective</b></p> <p>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.</p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14845	<b>BIOL 6500</b>	3.0	Advanced Statistical Modeling for Biologist	Donald Feener	M, W	2:00PM – 3:30PM	SFEBB 5160A
Full Semester Lecture	<p><b>Frequent MB Elective</b></p> <p>This course is designed for life science graduate students with a perhaps rusty background in mathematics and statistics who wish to become real practitioners of the art of modern statistics. The course is based on the R programming language.</p> <p><i>(Counts as 2 electives)</i></p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15575	<b>CHEM 7270</b>	2.0	Organic Spectroscopy I	Peter Flynn	M, W, F	11:00AM – 12:05PM	JTB 130
First Half Semester Lecture	<p><b>Recommended BC Elective</b></p> <p>Students should gain an understanding of NMR theory, experimental set-up and spectral interpretation/identification of organic molecules from 1D and 2D solution NMR spectra. Specifically:</p> <ul style="list-style-type: none"> <li>• Fundamentals of organic structural determination</li> <li>• Components of the NMR spectrometer, data acquisition and sample considerations</li> <li>• Chemical shift theory and estimation of <sup>1</sup>H and <sup>13</sup>C chemical shift through empirical formulas</li> <li>• J-coupling theory, magnetic equivalence and higher order spectra, and use of spin decoupling for signal enhancement</li> <li>• NMR relaxation – theory of longitudinal (T<sub>1</sub>) and transverse (T<sub>2</sub>) relaxation, experimental measurements of T<sub>1</sub> and T<sub>2</sub> (inversion-recovery, spin-echo, CPMG), quadrupolar relaxation effects, use of relaxation properties in spectral assignment</li> <li>• Nuclear Overhauser Effect (NOE) – theory and application</li> <li>• Multinuclear NMR – spectral interpretation for direct detection of <sup>15</sup>N, <sup>19</sup>F, and <sup>31</sup>P nuclei</li> <li>• Advanced 1D NMR techniques – theory and spectral interpretation of INEPT, DEPT, TOCSY, NOESY/ROESY data</li> <li>• 2D NMR techniques – theory and spectral interpretation of homonuclear: COSY, TOCSY, NOESY/ROESY, INADEQUATE; and heteronuclear: <sup>13</sup>C/<sup>1</sup>H HMQC, HSQC, HMBC data</li> </ul>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15769	<b>CHEM 7470</b>	2.0	Nucleic Acid Chemistry	Ming Chen Hammond	M, W, F	8:20AM – 9:25AM	MCD 230
Second Half Semester Lecture	<p><b>Frequent BC Elective (Biochemistry Research Track)</b> <b>Frequent MB Elective</b></p> <p><b>Prerequisite: 2 semesters undergraduate organic chemistry.</b></p> <p>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.</p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15682	<b>H GEN 6020</b>	1.0	Advances in Genetics:	David Grunwald Mark Metzstein	W	2:00PM – 4:00PM	EHSEB 4100D
Second Half Semester Seminar	<p><b>Frequent MB Elective</b></p> <p>Seminar for graduate students. Faculty and topics will change yearly. Consult instructor before registration.</p>						

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15369	<b>H GEN 6060</b>	2.0	Applied Computational Genomics	Aaron Quinlan	T, TH	10:30AM – 12:00PM	EHSEB 3515B
Full Semester Lecture	<p><b>Frequent BC Elective</b> <b>Frequent MB Elective</b></p> <p><b>Prerequisites: Complete "Learn the Command Line" from codecademy.com.</b></p> <p>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.</p> <p><i>(Counts as 2 electives)</i></p>						
7958	<b>H GEN 6421</b>	1.5	Genetics of Complex Diseases	Lynn Jorde	W	1:30PM – 3:30PM	EHSEB 2969
First Half Semester Lecture	<p><b>Frequent MB Elective</b></p> <p>This course addresses issues relevant to the identification of genes that underlie susceptibility to complex diseases. Topics include: design of genome-wide association and DNA sequencing studies; utilization of extended families; gene-gene and gene-environment interaction; use of the Utah Population Database. Methods and principles will be illustrated with discussions of ongoing studies of complex diseases such as inflammatory bowel disease, common cancers, and psychiatric diseases.</p>						
13604	<b>H GEN 6091</b>	1.5	Evolution & Development	Gabrielle Kardon Michael Shapiro	T, TH	1:15PM – 2:45PM	EHSEB 2962
Half Semester Second Half Lecture	<p><b>Frequent MB Elective</b></p> <p>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.</p>						
5554	<b>H Gen 6481</b>	1.5	Cellular Signaling	Charles Murtaugh	M, W, F	10:45AM – 11:35PM	EHSEB 3515B
First Half Semester Lecture	<p><b>Frequent MB Elective</b></p> <p>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.</p>						
19107	<b>MD CH 7891</b>	2.0	The Chemical Biology of Pain: Opioids and Beyond	Eric Schmidt	M, W, F	1:00PM – 2:00PM	EHSEB 4100C
First Half Semester Lecture	<p><b>Frequent BC Elective (Chemical Biology / Medicinal Chemistry Track)</b></p> <p>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.</p>						
12844	<b>MDCRC 6530</b>	2.0	Utilization of Animal Models in the Development of Clinical Research Projects	Anthea Letsou	W	1:00PM – 2:30PM	EHSEB 4100A

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Full Semester	<b>Frequent MB Elective</b>						
Lecture	<b>Med-2-Grad Core Course Requirement</b>						
<p>It is now possible to precisely modify any DNA sequence within the genome of the mouse. This course emphasizes using mouse models to dissect the genetic basis of human disease. Deletion of genes using homologous recombination will be covered extensively as will other methods of gene inactivation (anti-sense constructs, inhibitory RNA, etc.). New experimental systems for modeling human disease in zebra fish and C. elegans will also be covered.</p> <p><i>(Counts as 2 electives)</i></p>							
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12843	<b>PATH 7310</b>	1.5	Host Pathogen Interactions and Human Disease	Jessica Brown Matt Mulvey	M, W, F	2:00PM – 3:00PM	EHSEB 5100B
First Half Semester	<b>Frequent MB Elective</b>						
Lecture	<p>This course will examine the mechanisms and consequences of microbial interactions with host cells and tissues. The means by which microbial pathogens stimulate and overcome host defenses in order to cause disease will be explored. This course is suitable for all graduate students and can be repeated up to three times for credit. Topics change annually. This is a half semester course, offered in the spring.</p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15402	<b>PATH 7320</b>	1.5	Topics in Immunology	Scott Hale	T, TH	1:00PM – 2:30PM	EEJMRB Conference RM 5420
First Half Semester	<b>Frequent MB Elective</b>						
Lecture	<p><b>This class is specifically geared toward 1st year MB students.</b></p> <p>This course will address core topics in immunology including cellular and molecular mechanisms of innate and adaptive immune responses to infection, vaccines, autoimmunity and cancer immunology and immunotherapies.</p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11202	<b>PHCEU 7011</b>	3.0	Fundamentals of Pharmacokinetics	James Herron Shawn Owen	W, F	10:30AM – 12:00PM	EHSEB 2680
Full Semester	<b>Frequent BC Elective</b>						
Lecture	<p><b>Prerequisite: PHCEU 7010, or Special Permission from Instructor</b></p> <p>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.</p> <p><i>(Counts as 2 electives)</i></p>						

### Additional Electives

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
2241	<b>ANAT 7690</b>	3.0	Scientific Lecturing and Writing	Kurt Albertine	TBA	TBA	TBA
Full Semester	<p>To provide guidelines for writing clear scientific papers and delivering good lectures. Lectures, discussion, homework assignments and submission of a new original scientific paper in an area chosen by each student.</p> <p><i>(Counts as 2 electives)</i></p>						
Seminar							
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12208	<b>ANAT 7760</b>	3.0	Stem Cell Workshop	Oleksandr Shecheglovitoc	T, TH	2:00PM – 3:30PM	EHSEB 3420
Full Semester	The discovery of cell reprogramming techniques and the ability to reprogram any differentiated human cell into induced pluripotent stem cell						

Updated 1/11/2022

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Lecture	<p>(iPSC) have created unprecedented opportunities for the use of iPSCs in studying the fundamental aspects of human development, disease modeling, and regenerative therapies.</p> <p>This course is designed to equip graduate students and postdocs with all necessary knowledge and skills to be able to start working with human iPSCs and to know how to use these cells in different applications. The course consists of didactic lectures on stem cells and development, discussions of recent papers on stem cells, and three weeks long hands-on laboratory training to teach students to work with human stem cells and to differentiate stem cells into neurons or cardiomyocytes.</p> <p>As a result, the students will understand the potential and limitations of human stem cells in different applications, have practical experience working with human stem cells, and design a new research project related to the use of human stem cells</p> <p><i>(Counts as 2 electives)</i></p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
3495	<b>BIO C 7100 - 001</b>	1.0 – 2.0	Metabolism	Jared Rutter	TBA	TBA	TBA
Full Semester	<p><b>Advanced Seminar:</b> Student and faculty discussion of advanced-level topics not covered in formal courses. Contact Jared Rutter, <a href="mailto:rutter@biochem.utah.edu">rutter@biochem.utah.edu</a>, for course info and permission to register.</p>						
Special Topics							
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13942	<b>BIO C 7200</b>	2.0	Genetic Therapies	Dana Carroll Amy Hwkins	M-F	10:00AM – 11:30AM 1:30PM – 3:00PM	EHSEB 3515 C
March 21 – April 1	<p><b>Advanced Seminar:</b> Topics will include the latest in genome editing and related technologies, their applications in medicine, and the broader implications of their use in various contexts.</p> <p>This is an intensive 2-week course that will take place March 21-April 1, with twice daily meetings, 10-11:30 am and 1:30-3:00 pm. It is particularly appropriate for advanced students working in areas of biomedical research but is open to anyone with a background in molecular biology. Most sessions will feature a presentation by one of the faculty or a guest speaker, with plenty of time for discussion. Each student will make a short presentation during the final week on a topic of their choosing. The focus will be on engagement with the science and ramifications of the powerful technologies we now possess to address genetic diseases.</p> <p>The course should satisfy departmental requirements for an advanced course but check with your department to make sure. You are welcome to contact me if you have questions.</p> <p>To obtain a registration code, please contact Amity Mower in the Biochemistry Office, <a href="mailto:amity.mower@biochem.utah.edu">amity.mower@biochem.utah.edu</a>.</p>						
Seminar							
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
10219	<b>BIOL 6530</b>	3.0	Biological Chemistry	David Blair Martin Horvath	T, TH	10:45AM – 12:05PM	HEB 2008
Full Semester	<p>The course fee covers all required textbooks and course materials at a reduced cost. Students may request to opt out here: <a href="https://portal.verba.io/utah/login">https://portal.verba.io/utah/login</a></p>						
Lecture	<p>Structure and function of biomolecules, metabolism, and regulation.</p> <p><i>(Counts as 2 electives)</i></p>						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
6475	<b>CHEM 6810</b>	3.0	Nanosience: Where Biology, Chemistry and Physics Intersect	Yunshan Wang	T, TH	9:10AM - 10:30AM	AEB 350
Full Semester	<p>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.</p> <p><b>Note: This class will have an additional meeting TBA.</b></p> <p><i>(Counts as 2 electives)</i></p>						
Lecture							

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15615	<b>CHEM 7160</b>	2.0	Organometallic Chemistry I	Matthew Sigman	T, TH	9:10AM – 10:30AM	MCD 230
First Half Semester Lecture	This course is intended for graduate students in Chemistry with interests in the intersection of organic and inorganic chemistry. Organometallic chemistry is defined by metal complexes performing chemical reactions might involve intermediates containing transition metal-carbon bonds. The course will introduce fundamental concepts of both inorganic and organic chemistry and the application of these concepts to designing and applying catalytic chemical reactions to target directed organic synthesis, chemical biology, and material science.						
14874	<b>CHEM 7520</b>	2.0	Computational Chemistry Laboratory	Ryan Steele	M, W, F	8:20AM – 9:25AM	GC 1575
Second Half Semester Lecture	This course provides an introduction to electronic structure theory. Coverage includes (a) a theoretical foundation of computational methodology and (b) the practical usage of computational software packages as research tools. The course is useful for all branches of chemistry, as well as physics, engineering, and biology.						
18927	<b>CHEM 7590</b>	2.0	Advanced Topics in Physical-Analytical Chemistry	Jennifer Shumaker-Parry	M, W, F	11:00AM – 12:05PM	WBB 615 & Canvas
First Half Semester Special Topics	TBA This is an IVC Hybrid course, which uses a mixture of face-to-face, and synchronous online instruction.						
13034	<b>CHEM 7640</b>	2.0	Materials Chemistry for Alternative Energy	Shelley Minter	M, W, F	9:35AM – 10:40AM	GC 2760
First 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.						
18929	<b>CHEM 7790</b>	2.0	Lab on a Chip	Jennifer Shumaker-Parry	T, TH	10:40AM – 12:20PM	AEB 306 & Canvas
Second Half Semester Lecture	Topics will be related to Lab-On-a-Chip (LOC)/micro-Total Analysis Systems (mTAS). Fundamental topics related to scaling down analytical systems to the micro-scale and smaller will be the focus of discussions in the class. More in depth exploration of specific systems and applications will be through homework assignments and discussion of scientific articles. Major topics will include: 1) advantages and challenges of scaling down analytical methods, 2) micro/nano-fluidics, 3) fabrication approaches for LOC/mTAS, 4) micro/nano-scale separation methods, 5) detection approaches, and 6) combining LOC/mTAS with macro-scale methods. Three lectures, one discussion per week for 7.5 weeks.  This is an IVC Hybrid course, which uses a mixture of face-to-face, and synchronous online instruction.						
17689	<b>H GEN 6092</b>	2.0	Evolutionary Genetics and Genomics	Nathan Clark Ellen Leffler	M, W, F	9:20AM – 10:30AM	EHSEB TBA
Second Half Semester Lecture	This course will provide students with a rigorous introduction to the theory and practice of DNA and protein sequence analysis. Subjects will include sequence alignment & genome annotation; quantitative models of sequence change; methods for inferring phylogenetic relationships; and linkage mapping. These subjects will be illustrated with examples drawn from a wide range of fields including medical genetics, anthropological genetics, and comparative genome analysis.						
2923	<b>MATH 6780</b>	3.0	The Mathematics of Biological Regulation	Fred Adler	T, TH	10:45AM – 12:05PM	GC 5680
Full Semester Lecture	Regulation: What keeps biological systems under control?  The central question in ecology is "what regulates populations?" Cancer is the breakdown of the regulation within and between cells. Autoimmune disease is the failure of the immune system to regulate its response. As the study of feedbacks and their consequences, mathematical modeling provides the tools to understand and unify mechanisms of regulation in these and many other systems across the full range of biology. We will tentatively study  1. Population regulation in ecology						

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		<p>2. Regulation in systems of cells 3. Regulation within cells 4. Role of regulatory mechanisms in societies.</p> <p>There are no formal prerequisites, but knowledge of mathematical biology at the level of Math 5110-5120 will help. No knowledge of statistics or ecology is needed.</p> <p><i>(Counts as 2 electives)</i></p>					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
1999	<b>NEUSC 6050</b>	4.0	Systems Neuroscience: Functioning of the Nervous System	Greg Clark Alessandra Angelucci	T, TH, F	T/TH: 12:55PM – 1:45PM F: 10:45AM – 12:05PM	EHSEB 2948 EHSEB 2948
Full Semester Lecture		<p>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.</p> <p><i>(Counts as 2 electives)</i></p>					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
18956	<b>ONCSC 6700</b>	1.5	Cell Cycle Events: Mechanistic Insights and Disease Implications	Bruce Edgar Katharine Ullman	TH	2:00PM – 4:00PM	HCI-South TBA
First Half Semester Lecture		<p>This course will give students an in-depth view of the mechanisms of cell division and proliferative control. The course will be structured around classic and current literature reporting advances in the understanding of cell cycle events. Through discussion we'll consider how these events are integrated, and how mechanistic knowledge impacts our understanding of and approach to human disease. This will often relate to implications for cancer (therapeutic sensitivity, tumorigenesis, etc.), but may extend to other diseases. This is an advanced seminar course with a focus on critical reading of the primary literature and student presentations.</p>					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9216	<b>PHCEU 6020</b>	3.0	Biomaterials	Michael Yu	T, TH	10:45AM – 12:05PM	GC 2760
Full Semester Lecture		<p>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.</p>					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13275	<b>PH TX 6710</b>	1.0	Developments in Biochemical Toxicology	Chris Reilly	TBA	TBA	TBA
Full Semester Lecture		<p>This course will review current advances in the field of biochemical toxicology through weekly discussions of research articles.</p>					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
12871	<b>PH TX 7221</b>	1.0 – 6.0	Pharmacology II	Karen Wilcox	TBA	TBA	TBA
Full Semester Lecture		<p>Mechanism of action and pharmacologic effects of drugs acting on the cardiovascular and renal systems; pharmacology and mechanism of action of antibiotics and other chemotherapeutic agents; drugs acting on endocrine systems.</p>					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
19678	<b>PH TX 7690</b>	2.0	Professional Skills Development	Kristen Keefe	W	3:00PM – 5:00PM	EHSEB 4100C
Full Semester Special Projects		<p>In this course, trainees will focus on developing four professional skill areas to promote their leadership and communication skills. First, the course will address technical writing, with a focus on manuscript/review and technical report communications. These sections will emphasize rigor and transparency in scientific writing, including figure preparation, data analysis and reporting of results. Exercises will focus on preparation of a manuscript or review based on the trainee's research to date or research area. Second, students will learn about communication styles and rhetorical devices to apply to communicating their science to different stakeholders, including training in the preparation and delivery of a "Ted-talk" format presentation. Third, the class will address leadership development, including assessment of</p>					

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	leadership strengths and capabilities, and approaches to and practice in mindful leadership and effective team performance, collaboration and communication. Finally, career development issues including cover letters, resumes, and interviewing will be addressed. Students will prepare resumes and cover letters, as well as develop PAR/STAR-format descriptions of their knowledge and skills related to translational neuroscience
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The classes below, Tuition Benefits will **NOT** cover the differential tuition. Please be sure to check tuition bills and coverage

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
13828	<b>BMI 6019</b>	1.0	Bioinformatics in Practice: RNA-Seq Data Analysis	Younghee Lee	T	TBA	421 WA 1470
First Half Semester Lecture		Description of the course: The course provides an overview of various RNA-Seq data analysis tools and practices using Linux command line and shell script in CHPC. The overall goals of the course are to prepare the student in the methods of quality control (QC) of raw fastq files, to acquire basic shell script skills, and to conduct a research project using RNA-Seq data from scratch. This course will address the following key skills: Linux: This course fundamentally provides a lecture for how to execute the RNA-Seq analysis tools in Linux environment, Programming skills: Every topic in this course includes examples and practices using command line in Linux, Research design and writing: Students will conduct a group project from identifying a RNA-Seq dataset from SRA, conducting QC, applying appropriate alignment/assembly tools, and interpreting results. Final report will be a format of an abstract.  <u><b>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage.</b></u>					
5871	<b>BMI 6105</b>	3.0	Statistics for Biomedical Informatics	Gregory Stoddard	Online	Online	Online
Full Semester Lecture		This class covers a wide range of statistical methods, from basic statistics to advanced regression methods for repeated measurements, and developing and validating prognostic and diagnostic tests. The emphasis is on application and practice, using the statistical software Stata, rather than theory and formulas. Statistical programming, computer graphics, Monte Carlo simulation, and bootstrap simulation in Stata is taught. Epidemiology principles, such as confounding, bias, and causation are also covered. (Required for all biomedical informatics graduate students.)  <u><b>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage.</b></u>  (Counts as 2 electives)					
12411	<b>BMI 6106</b>	3.0	Introduction to Probability and Statistics for Biomedical Data Science	Edgar Hernandez	M, W	TBA	421 WA 1016
Full Semester Lecture		This course offers an introduction to an extensive array of methods for mathematical biomedical data analysis with emphasis on three major topics (probability analysis, statistical inference, and the basic concepts of statistical pattern recognition through machine learning), with a clear emphasis on the biomedical field. We will cover basic probability concepts such as recognizing the importance of the analysis of random events in real life applications using probability axioms and rules. This course will present descriptive and inferential data methods for predictive analysis on samples and populations. This introductory course lays the foundation for more advance classes offered at the Biomedical Informatics Department. As an additional component of this class will be the extensive use of the statistical software R, which is one of the most used statistical packages in many disciplines.  <u><b>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage.</b></u>  (Counts as 2 electives)					
14844	<b>BIOL 5120</b>	3.0	Gene Expression	Michael Werner	M, W, F	10:45AM - 11:35AM	CSC 205
Full Semester Lecture		How cells decode the information in their genomes and regulate the processing, localization, and degradation of RNA and proteins. Exploration of the role of gene expression in cell differentiation and disease. Reading from the current research literature. It is recommended that BIOL 2030 is completed prior to taking this course.  <u><b>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage.</b></u>  (Counts as 2 electives)					

## Spring 2022 Electives/Advanced Seminars

View Course Schedules online:

<https://student.apps.utah.edu/uofu/stu/ClassSchedules/main/1224/index.html>

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

Please note you may need Permission Codes to register. Please contact the Department Coordinator.

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
8278	<b>BIOL 5210</b>	3.0	Cell Structure and Function	Ofer Rog	T, TH	10:45AM - 12:05PM	PAB 103
Full Semester Lecture	<p>Relations between structure and function in animal cells. Membranes and permeability, structural components and motility, cell division, and hormone receptors and functions. Reading from current research literature.</p> <p><b><i>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage</i></b></p> <p><i>(Counts as 2 electives)</i></p>						
14847	<b>BIOL 5270</b>	3.0	Microbial Ecosystems	William Brazelton	T, TH	12:25PM-1:45PM	BIOL 150
Full Semester Lecture	<p>Microorganisms run the world. They are the foundation of every habitat on earth, from our bodies to the deep sea. The aim of this course is to train students to appreciate the fundamental microbial processes that are at the heart of many pressing medical and environmental issues today. The course is inherently interdisciplinary and will involve concepts in microbiology, genomics, ecology, evolution, and biogeochemistry. Students with any interest in medical, molecular, environmental, or evolutionary aspects of microbiology are welcome.</p> <p><b><i>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage</i></b></p> <p><i>(Counts as 2 electives)</i></p>						
2247	<b>BIOL 5315</b>	3.0	Advanced Human Anatomy	Mark Nielsen	M, W, TH	2:00PM – 3:30PM	JTB 130
Full Semester Lecture	<p>Design and organization of the human peripheral nervous system and its connections to the central nervous system. Establishes strong foundation for clinical neuroanatomy, incorporating solid biological principles of anatomy.</p> <p><b><i>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage</i></b></p> <p><i>(Counts as 2 electives)</i></p>						
13406	<b>BIOL 5350</b>	3.0	Ornithology	Cagan Sekercioglu	T, TH	12:25PM – 1:45PM	CSC 205
Full Semester Lecture	<p>Birds (Aves) constitute the best known class of organisms on earth. This course presents an overview of the enormous body of information on birds, including topics such as the evolutionary origin and early radiation of birds, molecular systematics, form and function, reproduction and development, population and community ecology, behavior and communication and conservation biology.</p> <p><b><i>Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage</i></b></p> <p><i>(Counts as 2 electives)</i></p>						