Spring 2020 Electives/Advanced Seminars

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
2384	**ANAT 7690**	3.0	Scientific Lecturing and Writing	Kurt Albertine	TBD	TBD	TBD
Full Semester	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.						
13416	**ANAT 7760**	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. ***Please Note: Class conflicts with MBIOL/BLCHM 6200 & 6300 T, Th 3-5PM.***						

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
3730	**BIO C 6600**	1.5	Metabolic Regulation	Janet Lindsley	T, Th	9:30-11:00	HSEB 2958
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.						

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
18367	**BIO C 6420**	1.5	Advanced Biochemistry	Michael Kay Wes Sundquist	T, Th	09:40-11:00	HSEB 2908
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
3750	**BIO C 7100**	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, for course info and permission to register.						

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16120	**BIO C 7200**	2.0	Genetic Therapies	Dana Carroll Jeffrey Botkin	M-F	9:00-10:30 3:30-5:00	HSEB 3515C
Special Times	Advanced Seminar: This intensive, 2-week, 2-credit elective course is designed to introduce advanced medical and graduate students to issues that will be relevant to research and practice in an era of molecular medicine. Emerging therapies based on genetic abnormalities are promising, but also frequently controversial. The course will begin with early efforts at gene therapy and attendant ethical considerations. It will cover contemporary methods for gene manipulation and recent clinical experience with genetic therapies. Human germline modification will be covered, as will current efforts at regulation and societal issues, including justice and access. Because of its relevance to human health, uses of genetic manipulation in food organisms will also be discussed. Relevant readings, largely from the primary literature, will be assigned for each session. In the first week, class time will consist of presentations by the faculty, discussions of the lecture material and the assigned readings, and broader discussion of issues raised by these exposures. In the second week, student presentations will replace a portion of the lecture time, the extent depending on the number of students enrolled. The student presentations will be on literature-based topics chosen by the students themselves in consultation with the faculty. The written assignments can take a number of forms, from thoughtful reviews of specific technical and/or ethical topics, to drafting of an opinion piece for submission to a newspaper, to a creative writing project for submission to Rubor.						

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17249	**BIOL 5120**	3.0	Gene Expression	Katherine Beebe	M, W, F	10:45-11:35	ASB 210
Full Semester	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.						

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
10745	**BIOL 5140**	3.0	Genome Biology	Richard Clark	Tu Th	9:10-10:30	LS 111
Full Semester		The sequence of the human genome, and that of other animals and plants, highlights the rapid progress in genomics, the study of the DNA sequence and genes of an organism. This course will examine recent findings in the field, with an emphasis on how advances in genomics are revolutionizing the ways by which we assign functions to sequence and genes. While human genomics will feature prominently, examples will be selected from diverse organisms to illustrate basic principle.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
8895	**BIOL 5210**	3.0	Cell Structure Function	Ofer Rog	T, Th	10:45-12:05	PAB 103
Full Semester		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.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
11109	**BIOL 6530**	3.0	Biological Chemistry	Martin Horvath Toto Olivera	T, TH	10:45-12:05	HEB 2008
Full Semester		Structure and function of biomolecules, metabolism, and regulation.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17250	**BIOL 6500**	3.0	Advanced Statistical Modeling for Biologist	Donald Feener	T, TH	12:25-01:45	ASB 210
Full Semester		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.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15948	**BMI 6016**	1.0	Biomedical Data Quality	Bernard Lasalle	Tu	5:30-6:30PM	421 WA 1470
Second Half Semester		Course description and teaching/learning methods: This half semester course (7 modules/sessions) will provide an introduction to understanding general concepts of data quality that can be applied to data sources from multiple domains and practical application of these concepts with a variety of biomedical data sources. In the first two module students will learn the universal principles of data quality, common measures of data quality and the role data quality has in understanding biomedical data. Specifically, students will learn about intrinsic data quality, contextual data quality, representational data quality and accessibility data quality when using and/or evaluating data source(s)1. Building on this foundation, in the remaining modules of the course, students will be exposed to a variety of biomedical data types in the context of research activities: predictive analytics, Natural Language Processing (NLP), genomic analysis, geospatial/environmental and clinical/translational research. Each research activity will be presented as individual course modules by domain experts and will include: How to access the data, What metadata is available or missing for assessing data quality, In what format(s) the data exists, What data cleaning can be done, Data transformations that may be required, How to analyze the data to obtain results, and Students will be able to work with, and evaluate, data from the data source selected for the module. ***Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage***					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15949	**BMI 6019**	1.0	Bioinfo in Practive: RNA	Younghee Lee	Tu	5:30-6:30PM	421 WA 1470
First Half Semester		Description of the course: The course provides an overview of various RNA-Seq data analysis tools and practices using Linux commend 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 commend 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. ***Note – Tuition Benefit does NOT pay for differential tuition charges. Please be sure to check tuition bills and coverage***					

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Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
6283	**BMI 6105**	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 Bioinforamtics 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
6908	**CHEM 6810**	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
10635	**CHEM 7030**	2.0	Introduction to Spectroscopy II	Michael Morse	M, W, F	9:35-10:40	HEB 2002
First Half Semester	This course focuses on the symmetry and spectroscopy of polyatomic molecules, covering electronic structure and spectroscopy. The student learns how to use point group theory as a guide to understanding electronic wavefunctions, vibrational motions, and selection rules. A good background in quantum mechanics is required; CHEM 7020: Introduction to Spectroscopy I is helpful but not required.						

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17277	**CHEM 7070**	2.0	Chemical Kinetics	Peter Armentrout	M,W,F	8:20-9:25	HEB 2010
Full 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
10811	**CHEM 7300**	2.0	Polymers: Chemistry	Ilya Zharov	T,TH	10:40-12:20	HEB 2002
First Half Semester	Meets with CHEM 5300. This course will cover the fundamentals of polymer chemistry and polymer structure. The topics will include basic types of polymers, their characterization, mechanisms of polymer formation, specific examples of polymer structures, applications of polymeric materials, advances in polymer chemistry. Three lectures, one discussion per week for 7.5 weeks. Students will be required to pass a midterm and a final exam and prepare a presentation on a topic of current interest in the area of polymer chemistry.						

Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
10630	**CHEM 7470**	2.0	Nucleic Acid Chemistry	Ming Hammond	M, W, F	8:20-9:25	HEB 2006
Second 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
14556	**CHEM 7640**	2.0	Materials Chemistry for Alternative Energy	Shelley Minteer	M,W,F	8:20-9:25	HSEB 2006
First Half Semester	Meets with CHEM 5640. 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.						

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5608	**CHEM 7780**	2.0	Surface Chemistry	Scott Anderson	M,W,F	8:20-9:25	HEB 2002
First Half Semester	This course is a half semester introduction to the physics and chemistry of solid surfaces, with about equal emphasis on scientific questions and on the spectroscopic and other methods used to probe surfaces. The focus is decidedly practical, and the course is intended for graduate students needing to understand surface properties in their future research, or for those interested in learning how to analyze surfaces.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17952	**BMI 6060**	2.0	Applied Computational Genomics	Aaron Quinlan	T, Th	9:10-10:30	HSEB 2928
Full Semester	***Frequent MB Elective*** ***Please note that full semester but only 2 Credit hours – only counts as 1 Elecitve*** Prerequisites: Complete "Learn the Command Line" from codeacademy.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
8527	**H GEN 6421**	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 allelicheterogeneity, 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
5920	**H GEN 6481**	1.5	Cellular Signaling	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
5825	**MD CH 7891**	2.0	Medicinal and Biological Chemistry	Eric Schmidt	M, W, F	1:00-2:00	HSEB 4100C
First Half Semester	***Frequent BC Elective (Chemical Biology / Medicinal Chemistry Research Track Course)*** Biological chemistry in the context of modern drug discovery and development. This course is intended for graduate students interested in a chemical approach to biological problems.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14235	**MDCRC 6530**	2.0	Animal Models	Anthea Letsou	W	1:00-2:30	HSEB 4100A
Full Semester	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.						
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
2099	**NEUSC 6050**	4.0	Systems Neuroscience: Functioning of the Nervous System	Greg Clark Alessandra Angelucci	T, Th F	10:45-12.05 12:55-1:45	WEB L112 WEB 2230
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
3153	**ONCSC 6500**	1.5	Clinical Biology of Cancer	Alana Welm	TBD	TBD	TBD
Second Half Semester		***Frequent MB & BC Elective*** 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
10629	**PATH 6910**	1.5	Noncoding RNAs and Immune Responses	Ryan O'Connell	Th	2:00-4:30	TBD
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. ***Please Note: Class conflicts with MBIOL/BLCHM 6200 & 6300 T, Th 3-5PM.***				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14232	**PATH 7310**	1.5	Host-Pathogen Interactions and Human Disease	Jessica Brown Matt Mulvey	M,W,F	2:00-3:00	HSEB 5100B
First Half Semester		***Frequent MB Elective*** 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 and cause disease will be explored. This half- semester course is suitable for all graduate students.				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
17999	**PATH 7320**	1.5	Topics in Immunology	Scott Hale	T,TH	1:00-2:30	EEJMRB 2nd Flr Conference Room 2420
First Half Semester		***Recommended as an appropriate MB Elective*** 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.				
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14961	**PH TX 6710**	1.0	Developments in Biochemical Toxicology	Chris Reilly	TBA	TBA	TBA
Full Semester		This course will review current advances in the field of biochemical toxicology through weekly discussions of research articles.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
9255	**PH TX 6720**	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
14273	**PH TX 7114**	2.0	Principles of Toxicology	Chris Reilly	TBA	TBA	TBA
Full Semester		General principles, testing procedures, toxic responses, and target organ toxicities.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
14274	**PH TX 7221**	2.0	Pharmacology II	Karen Wilcox	TBA	TBA	TBA
Full Semester		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.					

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9954	**PHCEU 6020**	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
12259	**PHCEU 7011**	3.0	Fundamentals of Pharmacokinetics	TBD	TBD	TBD	TBD
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.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
15778	**PHCEU 7020**	4.0	Physical Chemistry of Biomedical and Drug Delivery Systems	David Grainger	T,TH	2:00-4:00PM	TBD
Full Semester		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.					
Class #	Catalog #	Cr Hrs	Course Title	Lead Instructor	Day	Time	Bldg/Room
16740	**PHYS 6310**	3.0	Physics in Biology	Saveez Saffarian	T,TH	9:10-10:30AM	JFB102
Full Semester		***Recommended as an appropriate new BC Elective*** This course is designed to give students a good understanding of Physics involved in biological processes. The goal is to equip students with analytical tools that would enable them to tackle biological problems in new ways. Students with backgrounds in biology, chemistry and physics are equally encouraged however knowing basic calculus is a requirement for taking this course.					