2016 - 2017 COURSE CATALOG

IRELL AND MANELLA GRADUATE SCHOOL OF BIOLOGICAL SCIENCES

Please refer to the Course Numbering List. The elective courses are offered once every two years.
Please contact the Associate Dean for Curriculum - RJ Lin, PhD, with core and elective course issues.

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced Cancer Biology	BIOSCI 620	Shiuan Chen	The goal of the course is to provide our graduate students with basic and critical information on cancer. We hope to stimulate interest among our graduate students to develop translational research on cancer. Lectures 1-7 will provide important key aspects of cancer biology. Lectures 8-10 are to teach students about basic principles of chemoprevention, radiation therapy and chemotherapy. Lectures 11-16 will be taught by our clinical colleagues. The goal of the course is to provide our graduate students with basic and critical information on cancer. We hope to stimulate interest among our graduate students to develop translational research on cancer. Lectures 1-7 will provide important key aspects of cancer biology. Lectures 8-10 are to teach students about basic principles of chemoprevention, radiation therapy and chemotherapy. Lectures 11-16 will be taught by our clinical colleagues.	This course is not offered in the 2016 - 2017 Academic Calendar.				

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced DNA Repair, Epigenetics, and Cancer	BIOSCI 655	Timothy O'Connor	The course will explore fundamental concepts and mechanism of tumorigenesis, particularly how defects in DNA repair and epigenetic processes can both result in cancer and impact the efficacy of cancer therapies. The class will also help students master skills in searching for new information and knowledge through class discussions and attendance at seminars and a symposium related to the topics of the course. The course will be taught by a group of very active scientists in this field.	This course is not offered in the 2016 - 2017 Academic Calendar.					
Advanced Epigenomics	BIOSCI 660	Dustin Schones	The objectives of the course are to provide insight into problem-oriented epigenomics research at the City of Hope and explain experimental and bioinformatics tools for epigenome mapping experiments. Problem-based research lectures will focus on one biological problem and how it is approached using methods of epigenomics. Problem-based research lectures will also explain specific laboratory methods utilized for epigenomics.	This course is not offered in the 2016 - 2017 Academic Calendar.					

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced Immunology	BIOSCI 625	Zuoming Sun; Peter Lee	Many lectures will have a discussion of one to two research papers published in high impact journals within one-two years. The research papers will be given to the students in the week prior to the discussion. Each student gets to choose one paper to write the critique. Other than turning in the critique, all students need to be prepared to extensively participate in the discussion of the papers rather than just the paper they chose to write the critique. Each student's critique needs to address satisfactorily all seven questions listed below in order to get a good score. 1. What were they trying to prove? 2. What system did they use and why was it appropriate for the study? 3. What major methods were used to gather the data and why were they appropriate? 4. What were the major findings and why are they convincing (or not)? If not convincing, what experiment(s) would you propose that could be more convincing? 5. Did they prove their thesis and consider alternative explanations (explain)? 6. What do you think they should do next? 7. What do you not understand about this work?	This course is not offered in the 2016 - 2017 Academic Calendar.					

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced RNA	BIOSCI 650	Ren-Jang Lin: Mark Boldin	Topics in the following areas are to be covered: RNA Splicing and the spliceosome, RNA-binding protein and alternative splicing, Regulatory circular RNAs, Histone mRNA biogenesis, RNA engineering - Crispr RNA, RNA modification and delivery, MicroRNA, Small non-coding RNA and epigenetics, Long non-coding RNA and epigenetics, and Extracellular RNA communication.	M F	3pm - 4pm 3pm - 5pm	Weekly	Classroom #1207	1/9/2017	3/31/2017
Advanced Stem Cell Biology	BIOSCI 640	Michael Barish	The course examines the theories, principles, models, techniques, potentials, applications, and limitations of stem cell biology and its role in modern medicine. It is taught by instructors from basic and clinical departments spanning multiple disciplines including reproductive biology, developmental biology, and different areas of medicine, surgery, radiology, and tissue engineering. Each pair of lectures focuses on an area of stem cell and developmental biology. The first will review the background of current knowledge and technology, point out the direction of state of the art research, and discuss potential problems and controversies in the field.	T TH	9:30am - 10:30am 2:30pm - 4pm	Weekly	Classroom #1207	4/4/2017	6/29/2017

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced Stem Cell Research and Medicine	BIOSCI 645	Michael Barish	This class that explores the impact of stem cell research on our society in terms of social, legal and ethical issues. The first part of the course provides information about the fundamentals of ethics and moral philosophy and models of ethical decision. The second part addresses what exactly constitutes stem cell research, the current status of stem cell research in the scientific world, and the history of the legal and political decisions that have resulted in our current climate and controversy regarding stem cell research. The main body of the course consists of students giving presentations on specific topics that relate to ethical dilemmas that face the stem cell field.	This course is not offered in the 2016 - 2017 Academic Calendar.					

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced Topics in Comparative Medicine	BIOSCI 610	Richard Ermel	This course is an introduction to the laboratory mouse, one of the most widely used animal models for biomedical research. Course topics will explore the natural history and origin of the laboratory mouse, history and uses, breeding systems, nomenclature, normative biology, specific techniques (bio methodology, gnotobiotics, imaging, surgical), infectious agents and diseases, mouse genomics, mouse pathology, and mouse models (inbred, outbred, transgenic, knock-out and knock-in, immune-deficient, humanized) and their uses in the understanding and treatment of human diseases. In addition to weekly lecture presentations, each student will read, critique, and discuss selected literature and publications. Students interested in biomedical research using mouse models, medicine, and/or veterinary medicine will benefit from this course.	This course is not offered in the 2016 - 2017 Academic Calendar.				

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced Topics in Medicinal Chemistry: Drug Delivery	BIOSCI 680	Jacob Berlin	This course will focus on strategies for improving the delivery of therapeutics molecules including small molecule drugs, oligonucleotides and peptides. The first several weeks will cover modern methods of measuring drug distribution and activity as well as challenges to achieving efficient targeted delivery of "naked" therapeutics. The remainder of the course will discuss various systems that have been developed for improved targeting of drug delivery. These systems will include: local injection, hydrogels, liposomes, polymeric nanoparticles, and inorganic nanoparticles. For each topic, there will be a 2:1 ratio of discussion/presentation sections to lectures. Generally, a lecture will introduce an aspect of the topic and then a class period will be devoted to discussing a written review of the topic. Each student will also nominate, by writing a short paragraph, a recent paper on the subject for discussion at the third class period. One paper will be selected and one student will serve as the advocate for the paper and one student will serve as the "critical reviewer". At the conclusion of the course, each student will write a specific aims page on a novel research proposal of their choosing that addresses one of the challenges discussed in the class.	M W F	9am - 10 am	Weekly	Beckman Center 4th Floor Conference Room #4118	2/13/2017	4/14/2017

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Advanced Virology	BIOSCI 635	Jiing-Kuan Yee	Diseases induced by virus infection are a major cause of human morbidity and mortality. Infection by human immunodeficiency virus, West Nile virus or hepatitis C virus is prevalent and creates socio-economic burden. Emerging viruses such as influenza virus or Severe Acute Respiratory Syndrome corona virus are increasing threats to become pandemic. Current Topics in Virology is designed to address key areas at the forefront of virology. Topics to be covered will include: Emerging viral infections, Viral pandemics, Host responses to control of viral infections and Harnessing the power of viruses as therapeutic tools and Virus discovery. The course will be led by Virology faculty members and will consist primarily of discussion of key papers in the context of the covered topic. Students will be expected to critically and creatively analyze assigned papers and discuss each topic. Active participation by all is required. Grades will be determined by the quality of participation in discussions throughout the course and by a written commentary of a discussed paper at the end of the course.	This course is not offered in the 2016 - 2017 Academic Calendar.				

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Biochemistry and Structural Biology	BIOSCI 510	Markus Kalkum	The Biochemistry and Structural Biology course is one of the core courses of our graduate curriculum and is taught by faculty with strong background and expertise in biochemical research. The course educates the graduate students on the basic biochemistry, modern biochemical techniques, and structural biology, thus preparing them for their thesis research work. The course covers fundamental concepts and advanced topics of biochemistry and chemical and structural biology. We will focus on molecular structure function relationships of life's essential biochemical processes as well as state-of-the-art imaging and spectroscopic methods that are used to determine accurate macromolecular structures and to gain detailed insight into biochemical mechanisms. The topics to be covered in this course include nucleic acids, amino acids, carbohydrates, lipids and membranes, protein biochemistry, enzyme kinetics, protein structure analysis, separations and biophysical methods of characterizing protein complexes. The special topics in the final part of this course are designed to demonstrate contemporary applications of biochemical research strategies.	M T W F	9 am -10 am	Weekly	Classroom #1207	9/9/16	12/19/16

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Biostatistics	BIOSCI 540	Jeffrey Longmate	Students should learn fundamental statistical concepts in the context of biological research examples, while gaining some experience with common statistical methods, data handling, and basic statistical computing. The course should help students recognize and avoid statistical pitfalls, understand and use common calculations, and be aware of principled strategies when reading the scientific literature, planning investigations, or reasoning from data to conclusions.	M W and some Fridays	10:45 am - noon	Weekly	Classroom #1207	1/9/17	3/31/17
Cell Biology	BIOSCI 530	John Shively	• To understand the systemic inter-relationships from the perspective of integrative cell biology, biochemistry, developmental biology and pathophysiology. • To gain familiarity with cutting edge techniques and research problems being studied in human cell biology and its relationship to diseases. • To integrate various aspects of cell biology as applicable to your research. • To develop an analytical approach to solve problems which involve critical thinking and application of concepts learned from selected subjects in this course. • To promote your ability to understand and critically evaluate current research publications and seminars.	M - F	9 am - 10:30 am	Weekly	Classroom #1207	1/9/17	3/31/17

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Computational Molecular Biology	BIOSCI 543	Nagarajan Vaidehi	• To introduce the basics of computational methods including computational structural biology used for drug design and personalized medicine; analysis and integration of genomic and epigenomic data to investigate the molecular pathways involved in complex disease progression. • The goal of this course is to explain the principles behind existing programs and to take the students through the different analysis steps of an application so that they can make informed choices about software suitable for their needs. We will also introduce the students to new and emerging research in these areas. • We will have in silico laboratory sessions after every three lectures to give the students a hands on experience on how to use different computational methods for various types of problems and also learn basics of python programming. • The critical thinking and analysis will be tested with discussions of publications from current literature on how computational methods have been used for various research problems.	M W F	10:45 am - 12:15 pm	Weekly	Classroom #1207	2/24/17	3/27/17

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Concepts In Molecular Biology & Genetics Laboratory	BIOSCI 505	Glenn Manthey	This course will introduce basic genetic and molecular concepts including; genotype and phenotype, dominance and recessiveness, pleiotropism, complementation, epistasis and plasmid structure and manipulation. These core concepts will be presented in the context of investigating the genetic control of genome stability in the yeast model system, Saccharomyces cerevisiae. The benefit of utilizing a laboratory platform for instruction is it presents a tangible demonstration of the concepts that will be concurrently discussed in the Principles of Gene Expression (PoGE) lecture course. Course learning objectives: a) Develop operational perspective on the core genetic concepts introduced in PoGE . b) Become familiar with basic genetic and molecular biology lab techniques.	Due to the 2016 Lab Course format, please refer to the Orientation Schedule and 2nd & 3rd Week To Do document. The course coordinator will divide students into two groups for better learning and more attention.		Weekly	Graduate School Lab	8/22/16	9/8/16

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Funda-mentals of Scientific Research (FSR)	BIOSCI 550	Timothy O'Connor; Jeremy Stark	The capstone course for the core curriculum of a Ph.D. program in Molecular Biology should foster the further development of skills that contribute to the essential skill set for the professional scientist. The skills that beginners require the most opportunity to develop are: reading the scientific literature, writing, discussion, critique, and debate. Such a course should also permit students to leverage their prior training toward deepening their fund of scientific knowledge, and developing greater independence in evaluating the merits of different experimental approaches and bodies of work. This explicit transition from passive to active learning is an essential step in becoming an independent scientist. It is also required for the acquisition of the experimental design skills that are the foundation of a career in science.	M, TH	9 am - 12:15 pm	Weekly	Classroom #1207	3/29/17	6/15/17
Introduction to Grant Writing	BIOSCI 502	Jacob Berlin; Ian Talisman	Grant writing is one of the most important skills for successful scientists. The ability to place one's research in context and explain why it is important is an essential skill for any scientist. So too is the ability to logically organize proposed research and develop testable hypotheses. This short class aims to help students learn these skills using the task of preparing a fellowship application.	M - F	9am - 10:30am	Daily	Classroom #1207	8/29/16	9/9/16

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Pathology Mini-Course	BIOSCI 580	Robert Cardiff - Distinguished Professor of Pathology from UC Davis, & Richard Ermel	This is an award-winning, interactive course on Comparative Pathobiology for graduate students, post-doctoral fellows, and investigators using mice for the study of cancer biology. Cancer is a physical entity that destroys lives. The understanding of cancer requires the ability to appreciate both the structural and molecular aspects of the disease. This course aims to introduce the participants to the structural changes that result from their cellular and molecular based experiments. With a long history, mouse mammary tumorigenesis provides an excellent example for combining the structure and function. The comparative pathobiology provides important background for all animal model systems. This short course will use the comparative pathobiology of human and mouse breast cancer to illustrate and discuss model systems. This course is organized to emphasize basic principles of animal modeling that are applicable to other models. Participation is encouraged even if the lab is not currently using a mouse mammary model of cancer.	T TH	3pm - 5pm	Weekly	Classroom #1207	9/6/16	9/29/16

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Principles of Gene Expression	BIOSCI 520	Ren-Jang Lin Jeremy Stark	The purpose of the course is to prepare our students in several key areas that we believe a graduate level introductory course in molecular biology must accomplish. First, it must stimulate the acquisition and utilization of essential concepts and terms. Second, it must encourage the transition from passive learning from textbooks to active learning from the primary literature. Third, it should provide the students the opportunity to begin interpreting experimental results within the context of a body of work. Fourth, it must acquaint the students with the seminal experiments that form the foundation of molecular biology so they can observe the clearest possible application of the fundamental concepts that will be guiding their own experiments.	M W F	10:30am - 1pm	Weekly	Classroom #1207	9/9/16	12/19/16

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Responsible Conduct in Research	BIOSCI 500	Kate Sleeth	To help students navigate the ethical decision making. Lectures, discussions and writing assignments are covered these key areas: 1. Ethics and the Scientist presented by the research compliance officer (this covers collaborative research, research misconduct and the scientist as a responsible member of society) 2. Ethical use of animals in research provided by the director of the animal resources center 3. Ethical use of Humans in research given by the chairperson of the Institutional Review Board (IRB) and the IRB operations manager 4. Conflict of Interest (COI) presented by the campus COI manager 5. Mentoring given by one of the professors on campus (this includes mentor/mentee responsibilities) 6. Authorship and peer review provided by the scientific writing-editing manager and the director of the light microscopy core (this covers responsible authorship and publication as well as peer review) 7. Record keeping, ownership of data, and intellectual property presented by the manager of the campus Office of Technology Licensing (OTL) 8. Ethical Issues Surrounding Cloning, Transgenics, and Stem Cell Research provided by the Associate Dean of Administration and Student Development	M - TH	1st week: 3:30pm - 5pm 2nd week: 9am - 10:30am	Daily	Classroom #1207	8/15/16	8/26/16

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Scientific Writing Course	BIOSCI 600A	Chris Gandhi	This course addresses fundamental topics in scientific writing, with a focus on manuscript and grant proposal development. The course incorporates lectures and "hands-on" writing assignments to help students understand: • the importance of developing strong writing skills. • scientific misconduct (e.g., plagiarism, improper manipulation of figures) and how to avoid it. • how to develop major sections of common scientific documents (e.g., manuscripts, grant proposals). • the importance of preparation and organization in scientific writing. • how to improve word choice and syntax. The course provides students with the experience of writing a scientific document (second year qualifying exam) and having their work critiqued.	W	10:45pm - 12:15pm	Weekly	Classroom #1207	2/7/17	3/14/17

COURSE	COURSE #	ORGANIZER	BRIEF DESCRIPTION	DAY of the WEEK	TIME	OCCURRENCE	ROOM	START	END
Scientific Writing Course	BIOSCI 600B	Chris Gandhi	The ability to write high-quality, professional manuscripts and grant proposals is a necessary skill for biomedical researchers. This course addresses advanced topics in scientific writing, with a focus on developing, organizing, and writing larger documents for logical consistency and readability. The course incorporates lectures, discussions, and "hands-on" writing assignments to help students understand: • The importance of developing strong writing skills • The importance of preparation and organization in scientific writing • How to develop major sections of common scientific documents (e.g., manuscripts, grant proposals, and fellowships).	W	3pm - 4:30pm	Weekly	Classroom #1207	8/3/16	10/5/16