BIOLOGY (BIOL-GA)

BIOL-GA 1001 Bio Core I: Molecular Systems (4 Credits)
Typically offered Fall
This intensive team-taught core course surveys the major areas of up-to-date molecular biology, molecular genetics and systems biology. Topics include the molecular structure and function of proteins and polynucleic acids and their fundamental roles in cell biology and disease. A strong emphasis will be placed on novel experimental approaches that form basis of the current wave of discovery in biomedicine.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1002 Bio Core II: Cellular Systems (4 Credits)
Typically offered Spring
This intensive team-taught core course surveys the major areas of up-to-date cell biology. Topics include review of cell and membrane structure, organelle function, cytoskeletal dynamics, cell motility and division, cell cycle, cellular energetics, protein and ion transport, cell signaling, stem and nerve cells, immunology and cancer.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1004 Environmental Health (4 Credits)
Typically offered occasionally
Discusses some of the basic concepts of environmental science and major global environmental problems, such as global warming, soil erosion, overpopulation, and loss of biota. Another part of the course focuses on environmental health problems, such as exposure to lead, mercury, halogenated hydrocarbons, asbestos, and radon. Other lectures are devoted to carcinogenesis, air pollution, toxic wastes, epidemiology, and risk assessment.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1006 Toxicology (4 Credits)
Typically offered Fall
Introduction to the science of toxicology, stressing basic concepts essential to understanding the action of exogenous chemical agents on biological systems. Principles underlying the absorption, metabolism, and elimination of chemicals are discussed. Toxicokinetics, specific classes of toxic responses, and experimental methods used to assess toxicity are also examined.
Grading: GSAS Graded
Repeatable for additional credit: No
Prerequisites: BIOL-UA 22.

BIOL-GA 1007 Programming for Biologists (4 Credits)
Typically offered Fall
This course provides introductory theory and hands-on training in bioinformatics for graduate students or advanced undergraduates in biology who have no prior computational experience. Knowledge of foundational concepts and practical applications acquired in this course will provide a starting point for further advanced study in bioinformatics and computational biology. Hands-on exercises will introduce students to the Linux operating system and provide basic computer programming skills as applied to bioinformatics, using Python. Topics covered: pairwise and multiple sequence alignment, BLAST and related algorithms, sequence motifs, Hidden Markov Models, gene expression analysis, and resources for functional associations (gene ontology, pathways and networks).
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1009 Biological Databases & Datamining (4 Credits)
Typically offered Spring
The course is divided into three sections: 1) Introduction to MySQL and R. 2) Introduction to different data types, and 3) Machine learning methods for data mining. Students will learn to create their own database using MySQL and SQLite containing different types of biological data. Students will also learn to mine the heterogeneous biological data using machine-learning methods such as Support Vector Machines and Multiple Regressions. We will apply these methods on experimental data in order to classify and prediction gene function and regulation.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1011 Immunobiology (4 Credits)
Typically offered occasionally
Focuses on the mechanisms that govern the immune response and also trains students in reading and evaluating primary research articles that are published in peer-reviewed journals.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 1023 Hot Topics in Infectious Diseases (4 Credits)
Typically offered Spring
The relationship between microbial pathogens and their human hosts is continuously changing. Although our immune system has become extremely sophisticated throughout evolution, microbes are also evolving at a fast rate to overcome host defenses. The development of techniques, such as sanitation and vaccination, and the discovery of antimicrobial drugs, such as antibiotics, has revolutionized medicine. However, even though some infectious diseases have been eradicated (e.g., smallpox), others that were on the verge of extinction are re-emerging (e.g., TB) and new ones have gained prominence (e.g., AIDS). This course is designed as a detailed survey of some of the most important human pathogens. It investigates these agents in detail and includes the most cutting edge basic research findings as well as epidemiology, treatment and prevention of infections.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1031 Special Topics in Biology (4 Credits)
Typically offered occasionally
This course focuses on a specific topic in biology, indicated in the subtitle. The format of the course includes lectures as well as discussion of primary research articles.
Grading: GSAS Graded
Repeatable for additional credit: Yes
Prerequisites: BIOL-UA 25.

BIOL-GA 1032 Metabolic Disorders (4 Credits)
The course will discuss how normal physiological processes of the human body are disrupted by diseases. The cellular and molecular basis of physiological disorders such as the triad of metabolic syndrome (obesity, hypertension, and diabetes) and discuss how diseases such as cancer affect and interact with physiological systems will be covered. Class time will be a combination of lecture, discussion, and recitation.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1045 Protein Biochemistry (4 Credits)
Typically offered Fall and Spring
Provides students with a firm and rigorous foundation in the principles of modern protein biochemistry. These concepts form the basis for many of the great mechanistic advances now being made in biology and the medical sciences. The course will discuss the fundamental processes that enable proteins to form complex biological structures, respond to the environment, catalyze chemical reactions and perform work. A strong emphasis will also be placed on the state-of-the-art experimental approaches driving the current revolution in biochemical research.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1051 Cell Biology: (4 Credits)
Typically offered occasionally
In depth look at selected processes and structures in the eukaryotic nucleus. The course covers topics including nucleosomes, histone modifications, epigenetics, non-coding RNAs, nuclear bodies, through lectures and discussions of primary research articles.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1052 Frontiers in Microbiology (4 Credits)
This course will examine the principles of genetic circuit design in microbes by comparing a variety of naturally occurring genetic circuits that perform various functions (logic gates, oscillators, switches, memory, etc.) to engineered, synthetic circuits that perform similar functions. Coursework will include a quantitative review of gene regulation, reading of the primary literature concerning natural and synthetic genetic circuits, and mathematical/computational modeling of simple genetic circuits. Undergraduates must have Molecular and Cell Biology II (BIOL-UA 22). All students must have taken one semester of college-level calculus.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1080 Emerging Pathogens (4 Credits)
Typically offered Fall and Spring
Details a number of emerging pathogens either new in the population or increasing in incidence or geographic range, that infect human beings. Topics include pathogenic factors leading to disease, host response, clinical illness, epidemiology and epidemic potential for each pathogen as well as any relevant bacteriology, virology, and immunology.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1082 Genes, Neurons and Behavior (4 Credits)
Typically offered occasionally
Survey of principles and patterns of animal behavior. Covers classical ethological research of Lorenz and others and modern research on the molecular basis of behavior, especially in model systems. Behaviors studied include reproductive behavior, rhythmic behavior, learning and memory, and feeding behavior.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1101 Neuroplasticity and Disease (4 Credits)
Typically offered Spring
An introductory multidisciplinary course in Neuroplasticity is offered which covers the basic principles of biology, anatomy, endocrinology and pharmacology in typical and atypical human physiology in health and disease. All cells in the brain will be studied including stem cells, neurons, astrocytes, microglia and pericytes. Human diseases will be organized in clusters of Global Insults (e.g. tumors and stokes); Genetic Diseases (e.g. Huntington's and Down syndrome); Region Specific diseases (e.g. Parkinson's and oppositional defiant disorder); Chemical associated diseases (e.g. FAS and depression) and Treatments (e.g. opiates and amphetamines) These topics will be discussed in class on how they impact cytoskeletal and spine dynamics, neuronal migration, degeneration, memory, and aggression. Special attention is paid to the cellular actions of neurotransmitters, stress hormones, trophic factors, marijuana and opiates. Discussion of current literature and preparation of a term paper provide an in depth coverage of the subject of neuroplasticity and how it relates to human diseases.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1120 Developmental Biology (4 Credits)
Typically offered occasionally
The course is an depth coverage of developmental principles using diverse models from animals to plants. The course covers experimental strategies of developmental biology that have led to discoveries relevant to modern medicine and human health. These include limb, heart, and embryonic development in models that form the basis of our understanding of animal development. The course also covers recent advances in stem cell biology and induced pluripotency that are highly relevant to human health. The course covers these topics through the exploration of basic biology that uses molecular, biochemical, and genetic techniques. A basic knowledge of molecular biology is expected.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1122 Lab Molecular Biology I (4 Credits)
Typically offered Fall
Analyzes selective developmental systems using recombinant DNA techniques. Purification of nucleic acids from eukaryotes and prokaryotes; bacteria transformation; restriction enzyme analysis; immobilization of nucleic acids on nitrocellulose membrane; and DNA-DNA, DNA-RNA hybridization.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1123 Lab Molecular Biology II (4 Credits)
Typically offered occasionally
Analyzes selective developmental systems using recombinant DNA techniques. Purification of nucleic acids from eukaryotes and prokaryotes; bacteria transformation; restriction enzyme analysis; immobilization of nucleic acids on nitrocellulose membrane; and DNA-DNA, DNA-RNA hybridization.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1124 Lab in Molecular Bio III (4 Credits)
Typically offered Fall, Spring, and Summer terms
This course comprises an independent laboratory research project performed by the student under the supervision of a research mentor. Students typically spend ~15-20 hours a week in the lab on their research project.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1125 Lab Molecular Biology IV (4 Credits)
Typically offered Fall, Spring, and Summer terms
This course comprises an independent laboratory research project performed by the student under the supervision of a research mentor. Students typically spend ~15-20 hours a week in the lab on their research project.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1127 Bioinformatics & Genomes (4 Credits)
Typically offered Spring
The recent explosion in the availability of genome-wide data such as whole genome sequences and microarray data led to a vast increase in bioinformatics research and tool development. Bioinformatics is becoming a cornerstone for modern biology, especially in fields such as genomics. It is thus crucial to understand the basic ideas and to learn fundamental bioinformatics techThe recent explosion in the availability of genome-wide data such as whole genome sequences and microarray data led to a vast increase in bioinformatics research and tool development. Bioinformatics is becoming a cornerstone for modern biology, especially in fields such as genomics. It is thus crucial to understand the basic ideas and to learn fundamental bioinformatics techniques. The emphasis of this course is on developing not only an understanding of existing tools but also the programming and statistics skills that allow students to solve new problems in a creative way.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1128 Systems Biology (4 Credits)
Typically offered Fall
Topics cover a wide range of genomics techniques, ranging from genomics, transcriptomics, proteomics, interactomics, translatomics, to genome-wide association studies and "chromatinomics." Emphasis is placed on possibilities opened by experimental techniques, fundamental approaches to data analysis, and interpretation of the results with respect to their scope and limitations. The course does not involve programming.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1129 Evolutionary Genetics & Genomics (4 Credits)
Typically offered Spring
The genetic and genomic mechanisms underlying evolutionary change, including the genetics of adaptation and character regression; evolution of complex characters and traits such as organ systems, the senses, and patterns of behavior; methods for the study of quantitative trait locus (QTL) variation and multifactorial systems.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1130 Appl Genomics: Intro to Bioinformtcs &Netwrk Mod (4 Credits)
Typically offered Spring
This course introduces fundamental methods of analyzing large data sets from genomics experiments. Through a combination of lectures, hands-on computational training, and in-depth discussions of current scientific papers, students learn the conceptual foundations of basic analytical methods, the computational skills to implement these methods, and the reasoning skills to read critically the primary literature in genomics. Analysis focuses on data from genome-wide studies of gene expression using microarrays and from genome-wide studies of molecular interactions. Methods covered include clustering, multiple-hypothesis testing, and network inference. A large part of the course is dedicated to students completing an individual project that is tailored to meet their background and training.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1131 Biophysical Modeling of Cells & Populations (4 Credits)
Typically offered Spring
This course covers modeling of biological systems at multiple levels. The first part of the course begins with some basic molecular biology, including cooperative binding and simple induction of genes. A general approach to quantitative modeling of transcriptional regulation is developed and then applied to study small genetic circuits with feedback loops. Pattern formation and the mechanisms by which cells perceive spatial information from chemical signals are studied, and how biological systems can function robustly in the face of noise is investigated. In the second part of the course, cellular behaviors within heterogeneous populations are studied; also, population models are introduced (and relate the population models to the molecular/cellular models of the first part of the course). Diverse biological examples will be presented over the course of the semester to illustrate key concepts in modeling.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1132 Genomics of Human Populations (4 Credits)
This course covers topics in the field of human population genetics including human ancestry and admixture, human demography, linkage disequilibrium, genome-wide association studies (GWAS), genetic architecture of human traits and diseases, natural selection in the human genome, and application of population genomics to the study of cancer and disease. The course includes lecture and recitation components with the latter geared to teaching students basic skills in population genomic data analysis.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1133 Machine Learning in Medicine and Biology (4 Credits)
Typically offered Fall and Spring
This course provides introductory theory and hands-on training in machine learning for students in biology. Knowledge of foundational concepts and practical applications acquired in this course will provide a starting point for further advanced study in statistics and machine learning as applied to Biological and Medical data.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1134 Topics in Quantitative Biology (4 Credits)
Typically offered Fall and Spring
Courses in this area teach students to develop quantitative reasoning to analyze data. Rather than emphasizing computational and biostatistical toolkits, these courses employ mathematical models and computer simulations to describe biological processes.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 1140 Genomic Innovation (4 Credits)
This course focuses on understanding the current landscape of genome science and building ideas and organizations to accelerate progress in technology innovation, scientific understanding and industrial applications of genomics. The course will introduce students to cutting-edge technologies and applications in genetics and genomics and their responsible use in science and society.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2003 Bio Core III: Molecules & Cells/Discussion Based (4 Credits)
Typically offered Fall
This intensive team-taught course complements the lecture course Bio Core 1 by providing in-depth discussions of modern papers on topics related to those addressed in Bio Core 1, i.e., molecular and cellular biology from molecular structure and function of proteins/nucleic acids to cell division and apoptosis. These discussions are led by the same faculty who teach the corresponding lectures in Bio Core 1 and who have deep expertise in each area. This course is part of the suite of courses Bio Core 1-4.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2004 Bio Core IV: Genes, Systems & Evolution (4 Credits)
Typically offered Spring
This intensive team-taught course complements the lecture course Bio Core 2 by providing in-depth discussions of modern papers on topics related to those addressed in Bio Core 2, i.e., genetics, systematics, genomics, systems biology, development, plants, immunology, neurobiology, evolution, and geobiology. These discussions are led by the same faculty who teach the corresponding lectures in Bio Core 2 and who have deep expertise in each area. This course is part of the suite of courses Bio Core 1-4.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2005 Current Topics in Biology I: (2 Credits)
This course aims to provide students with the skills to critically read and evaluate primary literature articles in a small class setting. The course will guide students through papers by starting with a brief overview of the weekly topic and an introduction to the terminology used. In addition, it provides students with an in-depth look into a current area of biology including recent discoveries relevant to human health. The course is designed to improve the ability of students to critically evaluate scientific discoveries and ultimately to design experiments of their own.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 2006 Current Topics in Biology II: (2 Credits)
This course aims to provide students with the skills to critically read and evaluate primary literature articles in a small class setting. The course will guide students through papers by starting with a brief overview of the weekly topic and an introduction to the terminology used. In addition, it provides students with an in-depth look into a current area of biology including recent discoveries relevant to human health. The course is designed to improve the ability of students to critically evaluate scientific discoveries and ultimately to design experiments of their own.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 2007 Current Topics in Biology III: (2 Credits)
This course aims to provide students with the skills to critically read and evaluate primary literature articles in a small class setting. The course will guide students through papers by starting with a brief overview of the weekly topic and an introduction to the terminology used. In addition, it provides students with an in-depth look into a current area of biology including recent discoveries relevant to human health. The course is designed to improve the ability of students to critically evaluate scientific discoveries and ultimately to design experiments of their own.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 2008 Current Topics in Biology IV: (2 Credits)
This course aims to provide students with the skills to critically read and evaluate primary literature articles in a small class setting. The course will guide students through papers by starting with a brief overview of the weekly topic and an introduction to the terminology used. In addition, it provides students with an in-depth look into a current area of biology including recent discoveries relevant to human health. The course is designed to improve the ability of students to critically evaluate scientific discoveries and ultimately to design experiments of their own.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 2015 Genomics and Public Health (4 Credits)
Typically offered Spring
This course describes the developing relationship between genomics and genomic technologies with the health of populations in a global context. Topics covered include genomic technologies and their applications, genetic epidemiology, the human microbiome, infectious disease genomics, and the ethical, legal and social implications of genomics. The course consists of lectures, group discussions focused on current scientific papers, guest seminars, and a hands-on sequencing workshop. Students will leave the course with an increased awareness of how sequencing of microbes, parasites and human genomes helps develop better diagnostics and therapies and a greater understanding of human health globally. PREREQUISITES Students that are not Biology majors or who have not taken Biocore I (BIOL-GA.1001) should contact the Instructor prior to enrollment to discuss their academic background in biology.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2030 Statistics in Biology (4 Credits)
Typically offered Fall and Spring
Advanced course on techniques of statistical analysis and experimental design that are useful in research and in the interpretation of biology literature. Principles of statistical inference, the design of experiments, and analysis of data are taught using examples drawn from the literature. Covers the use of common parametric and nonparametric distributions for the description of data and the testing of hypotheses.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2031 Statistics and Machine Learning for Genomics (4 Credits)
Typically offered occasionally
Next#generation sequencing has led to the rise of large and noisy biological datasets, which require increasingly advanced analytical methods to glean biological insights. This course aims to enable students to analyze diverse types of genomic data, ranging from studies focused on human genetics (i.e. Genome#wide association studies), to functional genomics (i.e. ChIP#seq or RNA_seq, extending even to the single cell level) To accomplish this, we will review the theory and implementation behind key concepts and methods in statistical learning, and apply these to genomic datasets. The course will roughly be divided into two sections: supervised and unsupervised learning. In the first section, we will focus on predictive algorithms that perform classification and regression based on training datasets. In the second section, we will explore methods used to identify hidden structure in large genomics datasets, in particular, clustering algorithms and dimensional reduction techniques.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2040 Molecular and Genetic Toxicology (4 Credits)
Typically offered Fall
Analyzes the modes by which organisms handle damage to DNA by physical and chemical agents, the mechanisms of converting damage to mutations, and the theoretical basis for carcinogenesis screening methods utilizing mutagenesis. Topics include systems for mutagenesis testing, mutational spectra, and inducible responses to DNA damage.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2130 Developmental and Stem Cell Systems I (2-6 Credits)
Typically offered occasionally
Explores fundamental questions, concepts, and methodologies of modern inquiry into the genetic and epigenetic mechanisms of development through lectures, readings in the primary literature, and laboratory work. Topics include embryonic axis determination, region-specific gene expression, cell specification through cell-cell interaction, gastrulation, and organogenesis.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2131 Developmental and Stem Cell Systems II (2-6 Credits)
Typically offered occasionally
Fundamental questions, concepts, and methodologies of modern inquiry into the genetic and epigenetic mechanisms of development are explored through lectures, readings in the primary literature, and laboratory work.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2220 Neurobiology and Disease (4 Credits)
Typically offered occasionally
This course covers topics in neurobiology that apply to specific human disorders. We will discuss a range of topics including cognition, learning, and memory centered around three disease case studies in Alzheimer's, Parkinson's, and Autism Spectrum Disorder. Students will practice and acquire skills in current literature research, by reading and analyzing the primary literature in these topics. Students will also develop research ideas, and acquire effective scientific presentation skills.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2303 Intro to Biostatistics (4 Credits)
Typically offered Fall
Introduction to probability and statistical methods utilized in the analysis and interpretation of experimental and epidemiologic data. Statistical techniques associated with the normal, binomial, Poisson, t, F, and chi-squared distributions, plus an introduction to nonparametric methods. Applications in biology, medicine, and the health sciences.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 2310 Principles of Toxicology (4 Credits)
Typically offered Spring
Broad introduction to the science of toxicology, stressing basic concepts essenBroad introduction to the science of toxicology, stressing basic concepts essential to the understanding of the action of exogenous chemical agents on biological systems. Principles underlying the absorption, metabolism, and elimination of chemicals are discussed. Toxicokinetics, specific classes of toxic responses, and experimental methods used to assess toxicity are reviewed.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 3001 The Art of Scientific Investigation (2 Credits)
Typically offered Fall
This course in the ethics and communication of scientific research is designed to complement the more information-based courses offered by the Depart-ment of Biology and equips Ph.D. students with the necessary skills to conduct research ethically and to be aware of the ethical and societal implications of their research. The course also trains students in effective scientific communication through paper writing and presenting research to specialist and nonspecialist audiences and in fellowship and grant writing.
Grading: GSAS Graded
Repeatable for additional credit: No

BIOL-GA 3015 Pre-Doctoral Colloquium (2 Credits)
Typically offered Fall and Spring
Students gain experience in the preparation and presentation of formal scientific seminars.
Grading: GSAS Pass/Fail
Repeatable for additional credit: Yes

BIOL-GA 3034 Predoc Col Srvy Lab Mthd (2 Credits)
Typically offered Fall
First term: Students attend orientation sessions with individual faculty to discuss current departmental research.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 3035 Predoc Col Srvy Lab Mthd (4 Credits)
Typically offered Spring
Second term: Each student arranges to complete three projects (six to eight weeks in duration), each under the supervision of a different faculty member, in the department?s laboratories.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 3303 Research (1-6 Credits)
Typically offered Fall and Summer terms
Individual research projects carried out under the supervision of the faculty.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 3304 Research (1-6 Credits)
Typically offered Spring and Summer
Individual research projects carried out under the supervision of the faculty.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 3305 Reading (1-6 Credits)
Typically offered Fall and Summer terms
Reading and analysis of selected literature in a specific area of biology under the supervision of the faculty. Gives students intensive coverage of material that is appropriate for their individual research needs.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 3306 Reading (1-6 Credits)
Typically offered Spring and Summer
Reading and analysis of selected literature in a specific area of biology under the supervision of the faculty. Gives students intensive coverage of material that is appropriate for their individual research needs.
Grading: GSAS Graded
Repeatable for additional credit: Yes

BIOL-GA 3313 Internship for MS (1-4 Credits)
Working in an industrial setting is a valuable experience for a graduate student's training. This course enables students in the Biology Masters program to conduct an internship or co-op with a non-academic sponsor in the field of Biology. Credits earned from the course will count towards graduation.
Grading: GSAS Pass/Fail
Repeatable for additional credit: Yes

BIOL-GA 3323 Internship for PhD (1-4 Credits)
The course enables students to conduct an internship with a non-academic sponsor. Experiencing and working in an industrial setting is a critical experience for a graduate student's training. This course will enable graduate students (PhD program) to conduct an internship with a non-academic sponsor in the general field of Biology. Credits earned from the course will count towards graduation. Students must secure an internship position themselves, e.g. by approaching an individual at the organization or institution to obtain sponsorship and agreement to provide counsel and any necessary space and facilities for the internship. The internship content and duration has to be approved by the Instructor. The student must submit a final report to complete the course. Students are encouraged to discuss course participation with the Instructor prior to registration.
Grading: GSAS Pass/Fail
Repeatable for additional credit: Yes