Biology Courses

Courses

BI 121. Introduction to Human Physiology. 4 Credits.
Study of body functions with emphasis on organs and systems. Cell function, genetics, nutrition, exercise; function of the gut, heart, vessels, glands, lungs, nerves, and muscles with practical applications. Lecture, laboratories.

BI 122. Introduction to Human Genetics. 4 Credits.
Principle concepts of genetics and application to humans: genetic diseases, cancer, sex development, population genetics, and methodology of genetic testing, gene editing and gene therapy. Ethical and societal implications of prenatal tests, BRCA gene tests, sex-testing, ancestry services and CRISPR.

BI 123. Biology of Cancer. 4 Credits.
Comparison of cancer cells with normal cells; causes of cancer, including viral and environmental factors; biological basis of therapy. Lectures, laboratories.

BI 130. Introduction to Ecology. 4 Credits.
The concept of an ecosystem; organismal energetics; biogeochemical cycles; succession; population growth; species interactions, species diversity; implications for human ecosystems. Lectures, discussions.

BI 132. Introduction to Animal Behavior. 4 Credits.
Animal behavior, its evolutionary origins, and its neural mechanisms. Readings and films illustrate the adaptive nature of orientation, navigation, communication, and social behavior. Lectures, discussions.

BI 140. Science, Policy, and Biology. 4 Credits.
Explores the biology behind important topical issues such as stem cells, cloning, and genetically modified organisms. How policy decisions affect research in these areas. Lectures, discussions.

BI 150. Ocean Planet. 4 Credits.
This course is designed to give students an appreciation for the global ocean, the diversity of marine life, methods and techniques for studying the sea, and their own opportunities to contribute to sustainable and healthy marine ecosystems. Credits will be deducted for regression if BI 357 is taken first. Students cannot receive credit for both BI 150 and ERTH 307.

BI 170. Happiness: a Neuroscience and Psychology Perspective. 4 Credits.
Examination of studies in neuroscience and positive psychology that explore the mental and behavioral actions leading to the self-reporting of a well-lived and fulfilling life. Exploration of the interaction of multiple psychological and neural circuit variables in development of a positive mental state.

BI 196. Field Studies: [Topic]. 1-2 Credits.
Repeatable.

BI 198. Laboratory Projects: [Topic]. 1-12 Credits.
Repeatable.

BI 199. Special Studies: [Topic]. 1-5 Credits.
Repeatable.

BI 199L. Special Studies: [Topic]. 4 Credits.
Repeatable.

BI 211. General Biology I: Cells. 5 Credits.
How cells carry out functions of living organisms; genetic basis of inheritance; how genes and proteins work. Lectures, laboratories. Sequence with BI 212, BI 213, BI 214.
Prereq: CH 111 or CH 113 or CH 114 or CH 221 or CH 224H.

BI 212. General Biology II: Organisms. 5 Credits.
How cells develop and interact within complex organisms. Comparative anatomy and physiology of plants and animals. Lectures, laboratories-discussions. Sequence with BI 211, BI 213, BI 214.
Prereq: BI 211.

BI 213. General Biology III: Ecology and Evolution. 5 Credits.
How organisms interact with their environments and with each other; ecology, evolution, and diversity. Lectures, laboratories, field trips.
Prereq: BI 211.

BI 214. General Biology IV: Biochemistry and Genetics. 5 Credits.
Topics in Biochemistry: Amino Acid Chemistry, Protein Structure and Function, Hemoglobin, DNA Structure and Mutations; Topics in Genetics: Metabolic Pathways, Mutant Analysis, Complementation Tests, Regulation of Transcription, and the Lac Operon. Both lectures and laboratories. Sequence with BI 211, BI 212.
Prereq: BI 212 and CH 223 or CH 226H.

BI 281H. Honors Biology I: Cells, Biochemistry and Physiology. 5 Credits.
Focuses on the cellular structures and chemical reactions that allow cells to grow, to transform energy, and to communicate. Lectures, laboratories. Sequence with BI 282H, BI 283H.
Prereq: CH 223 or CH 226H or equivalent.

BI 282H. Honors Biology II: Genetics and Molecular Biology. 5 Credits.
How living organisms store, replicate, and transmit their genetic information, and how this information directs the activities of the cell and organism. Lectures, laboratories. Sequence with BI 281H, BI 283H.
Prereq: BI 281H with C- or better or P.

BI 283H. Honors Biology III: Evolution, Diversity and Ecology. 5 Credits.
The genetic basis and ecological context of evolutionary change leading to an examination of the generation and major patterns of biodiversity. Lectures, laboratories, field trips. Sequence with BI 281H, BI 282H.
Prereq: BI 282H with grade of C– or better or P

BI 307. Forest Biology. 4 Credits.
Structure and function of forested ecosystems emphasizing the Pacific Northwest. Interactions among trees, microorganisms, and animals; disturbance and recovery; forest management. Lectures, laboratories, field trips.
Prereq: BI 213 or BI 283H.

BI 309. Tropical Diseases in Africa. 4 Credits.
Biological and medical aspects of major infectious and parasitic diseases in Africa, including HIV/AIDS and malaria; socioeconomic issues in public health; case studies. Lectures, discussions.
Prereq: BI 212 or BI 282H.

BI 320. Molecular Genetics. 4 Credits.
Molecular mechanisms regulating control of gene expression. Topics include chromosome structure, transcription and processing of RNA, control of transcription, translational control, and genetic rearrangement. Lectures, discussions.
Prereq: BI 214 or BI 282H.

BI 322. Cell Biology. 4 Credits.
Eukaryotic cell nuclear structure and exchange, protein trafficking, endocytosis, chaperones, cytoskeletal functions, intercellular junctions, extracellular materials, signaling, cell division mechanics and controls, aging and death. Lectures, discussions.
Prereq: BI 214 or BI 282H; CH 331 recommended.

BI 326. Immunology and Infectious Disease. 4 Credits.
In this course we will explore the principles of immune system function as well as how microorganisms avoid the immune system to cause infectious disease. Topics include innate and adaptive immunity, cells of the immune system, vaccines, antibiotics, and immune-based therapies.
Prereq: BI 214 or BI 282H.

BI 328. Developmental Biology. 4 Credits.
Topics include genetic regulation, nucleocytoplasmic interactions, organogenesis, morphogenesis, pattern formation, cell differentiation, and neoplasia. Lectures, laboratories.
Prereq: BI 214 or BI 282H.

BI 330. Microbiology. 3 Credits.
Biology of bacteria: photosynthetic, heterotrophic, and others. Cell structure and function, metabolism including anaerobic and O2-producing photosynthesis, nitrogen fixation, species interactions, and role in major geochemical cycles. Lectures.
Prereq: BI 214 or BI 282H.

BI 331. Microbiology Laboratory. 3 Credits.
Microbial diversity through laboratory projects involving enrichments, culture isolations, and partial characterizations. Two scheduled laboratories and one scheduled lecture per week; additional unscheduled time required. Laboratories.
Prereq: BI 214 or BI 282H; pre- or coreq: BI 330.

BI 353. Sensory Physiology. 4 Credits.
Introduction to physiology of the senses: cellular physiology of peripheral receptors through the computational mechanisms that are ultimately related to perception. Lectures, discussions.
Prereq: BI 214 or BI 282H.

BI 356. Animal Physiology. 5 Credits.
Neurophysiology, endocrinology, muscle contraction, and homeostatic mechanisms of circulation, respiration, metabolism, ionic regulation, and excretion in mammals; comparison with those in other animals. Lectures, laboratories.
Prereq: BI 214 or BI 281H.

BI 357. Marine Biology. 4 Credits.
Ecology and physiology of marine plants and animals. Comparisons of various marine habitats. Human influences on marine systems. Lectures, laboratories, field trips.
Prereq: BI 213 or BI 283H. Credits will be deducted for regression if BI 458 or BI 474 are taken first.

BI 358. Investigations in Medical Physiology. 4 Credits.
Human physiology with research and clinical medicine applications. Nervous system, addiction medicine, endocrinology, immunology, cardiology, digestion, nutrition, reproduction, infertility, pediatrics, and ophthalmology. Lectures, discussions, primary literature research. Human anatomy and physiology background preferred.
Prereq: one from BI 214, BI 283H, HPHY 324.

BI 359. Plant Biology. 4 Credits.
A detailed introduction of the unique features of the biology of land plants, including ecology, physiology, developmental genetics, and evolutionary biology. Lectures, discussions.
Prereq: BI 211; BI 212; BI 213 or BI 281H; BI 282H; BI 283H.

BI 360. Neurobiology. 4 Credits.
Function of the nervous system from the single neuron to complex neural networks. Topics range from molecular and cellular neurobiological mechanisms to systems and behavioral analyses. Lectures, discussions.
Prereq: BI 214 or BI 282H.

BI 370. Ecology. 5 Credits.
Relationship of organisms to their environment in space and time. Factors controlling the distribution and abundance of organisms, introductions to community systems, and ecosystems. Required fieldwork. Lectures, laboratories, field trips.
Prereq: BI 213 or BI 283H. Calculus or statistics recommended.

BI 374. Conservation Biology. 4 Credits.
Global patterns of biological diversity; major threats to biodiversity; application of ecology, evolution, genetics, and other areas to protect and maintain biodiversity. Lectures, discussions.
Prereq: BI 213 or BI 283H.

BI 380. Evolution. 4 Credits.
Origin and maintenance of genetic variability. Historical and geographic patterns of variation. Application of population genetics to understanding evolutionary processes; modes of speciation. Lectures, discussions.
Prereq: college algebra and BI 213 or BI 283H.

BI 390. Animal Behavior. 4 Credits.
How and why animals behave, and how animal behavior is studied. Mechanisms of behavior, behavioral ecology, and sociobiology. Lectures, discussions.
Prereq: BI 213 or BI 283H.

BI 395. Tropical Ecology. 4 Credits.
Ecological theories for the maintenance of tropical diversity is the main focus of the course. Topics include biogeography, human land use change, and eco-evolutionary perspectives.
Prereq: BI 213 or BI 283H.

BI 399. Special Studies: [Topic]. 1-5 Credits.
Repeatable.
Prereq: BI 212 and BI 213 and BI 214 or BI 283H.

BI 399L. Special Studies: [Topic]. 4 Credits.
Repeatable.
Prereq: BI 212 and BI 213 and BI 214 or BI 283H.

BI 401. Research: [Topic]. 1-16 Credits.
Repeatable.

BI 402. Supervised College Teaching. 1-6 Credits.
Repeatable for maximum of 9 credits.

BI 403. Thesis. 1-12 Credits.
Repeatable.

BI 404. Internship: [Topic]. 1-16 Credits.
Repeatable.

BI 405. Reading and Conference: [Topic]. 1-16 Credits.
Repeatable.

BI 406. Practicum: [Topic]. 1-12 Credits.
Repeatable.

BI 407. Seminar: [Topic]. 1-2 Credits.
Repeatable.

BI 408. Workshop: [Topic]. 1-12 Credits.
Special laboratory training in research methods. A fee may be charged for supplies and materials that become the property of the student.
Repeatable

BI 409. Capstone. 1-12 Credits.
Repeatable.

BI 410. Experimental Course: [Topic]. 1-16 Credits.
Repeatable.
Prereq: BI 212 and BI 213 and BI 214 or BI 283H.

BI 410L. Experimental Course: [Topic]. 4 Credits.
Repeatable.

BI 422. Protein Toxins in Cell Biology. 4 Credits.
Mechanisms used by protein toxins to kill other organisms and how they have been used as molecular scalpels to dissect pathways in cell and neurobiology. Lectures, discussions.
Prereq: BI 322, BI 356, or BI 360.

BI 423. Human Molecular Genetics. 4 Credits.
Advanced topics in genetics that relate to human development and disease. The human genome, sex determination, X chromosome inactivation, chromosomal abnormalities, trinucleotide repeat expansions, cancer. Lectures, discussions.
Prereq: BI 320.

BI 426. Genetics of Cancer. 4 Credits.
Genetic regulation of cancer. Topics include oncogenes and tumor suppressor genes, signal transduction pathways, genetic animal models, and rationale treatment design. Lectures, discussions.
Prereq: BI 214 or BI 282H; one course from BI 320, BI 322.

BI 427. Molecular Genetics of Human Disease. 4 Credits.
Advanced discussions of heritable diseases from single-gene mutations such as cystic fibrosis to complex multigenetic diseases such as autism and schizophrenia. Lectures, discussions.
Prereq: BI 320.

BI 428. Developmental Genetics. 4 Credits.
Genetic regulation of development, including investigations of molecular mechanisms and studies of developmental mutants. Topics include molecular biology of eukaryotic chromosomes, genetic mosaics, and models of gene regulation. Lectures, discussions.
Prereq: BI 320, BI 328.

BI 432. Mycology. 5 Credits.
Physiology, ecology, structure, and classification of fungi; emphasis on structural and physiological adaptations to saprophytic, parasitic, and symbiotic modes of existence. Lectures, laboratories.
Prereq: BI 213 or BI 283H.

BI 433. Bacterial-Host Interactions. 4 Credits.
Examines spectrum of interactions between bacteria and animals, from pathogenesis to symbiosis, focusing on the molecular and cellular bases of these interactions. Lectures, discussions.
Prereq: BI 320 or BI 322 or BI 330.

BI 442. Systematic Botany. 5 Credits.
Principles of plant classification with emphasis on flowering plants, introduction to taxonomic theory and methods of biosystematics, collection and identification procedures, recognition of common families in native flora. Lectures, laboratories, field trips.
Prereq: BI 213 or BI 283H.

BI 448. Field Botany. 4 Credits.
Intensive study of the regional flora; ecology and native uses; sight recognition of prominent species; field characteristics of principal plant families; identification using dichotomous keys. Lectures, field trips. Offered summer session only.
Prereq: BI 213 or BI 283H.

BI 451. Invertebrate Zoology. 1-8 Credits.
Representative invertebrate groups with emphasis on marine forms; morphology, systematics, life history, and ecology. Lectures, laboratories, field trips. Offered at Oregon Institute of Marine Biology.
Prereq: BI 213 or BI 283H.

BI 452. Insect Biology. 4 Credits.
Anatomy, physiology, systematics, and behavior of insects. Insect societies. Lectures, laboratories, field trips. Offered summer session only.
Prereq: BI 213 or BI 283H.

BI 454. Estuarine Biology. 5 Credits.
The biological and physical factors regulating abundance, distribution, production, and biodiversity within estuaries. Includes field trips to marshes, tidal flats and exploration of estuarine habitats. Offered at Oregon Institute of Marine Biology.
Prereq: BI 213 or BI 283H.

BI 455. Marine Birds and Mammals. 1-6 Credits.
Principles of morphology, physiology, evolution, life history, and systematics as demonstrated through study of birds and mammals of the Oregon coast. Comparison of the fauna from the open sea to coastal waters. Lectures, laboratory, field trips. Offered at Oregon Institute of Marine Biology.
Prereq: BI 213 or BI 283H.

BI 457. Marine Biology: [Topic]. 1-8 Credits.
Content varies. Topics include comparative embryology, environmental issues, biology of fishes, and other subjects related to marine biology. Lectures, laboratories, field trips. Repeatable when topic changes. Offered at Oregon Institute of Marine Biology.
Prereq: BI 212 & BI 213 or BI 283H.

BI 458. Biological Oceanography. 5 Credits.
Examines patterns of biological productivity and controlling physical and chemical mechanisms in the various environments of the world's oceans. Lectures, laboratories, field trips. Offered at Oregon Institute of Marine Biology.
Prereq: BI 213 or BI 283H.

BI 461. Systems Neuroscience. 4 Credits.
Principles of organization of nervous systems with emphasis on vertebrate brain and spinal cord. Functional implications of synaptic organization and pattern of projections, and comparative aspects. Lectures, discussions.
Prereq: BI 353 or BI 360 or equivalent.

BI 463. Cellular Neuroscience. 4 Credits.
Physiology of excitation, conduction, and synaptic transmission. Lectures, discussions.
Prereq: BI 360.

BI 466. Developmental Neurobiology. 4 Credits.
Mechanisms underlying development of the nervous system. The genesis of nerve cells; differentiation of neurons; synaptogenesis and neuronal specificity; plasticity, regeneration, and degeneration of nervous tissue. Lectures, discussions.
Prereq: BI 320, BI 328.

BI 468. Amphibians and Reptiles of Oregon. 4 Credits.
Field identification and understanding of ecology, biogeography, and evolution of the common herpetofauna of four major physiographic regions of Oregon. Conservation biology issues addressed. Lectures, field trips. Offered summer session only.
Prereq: one year of college biology or BI 213 or BI 283H.

BI 471. Population Ecology. 4 Credits.
Theoretical, experimental and applied aspects of growth, structure, and regulation of natural populations; population estimation; demographic analysis; life-history theory. Lectures, discussions.
Prereq: MATH 247 or MATH 252; BI 370.

BI 472. Community Ecology. 4 Credits.
Quantitative and conceptual approaches to the study of biological communities. Biodiversity measurement. Effect of climate and climate change on ecosystem structure and function. Lectures, discussions.
Prereq: BI 370.

BI 474. Marine Ecology. 1-8 Credits.
Factors that influence the distribution, abundance, and diversity of marine organisms. Field emphasis on local intertidal and shallow-water communities. Offered at Oregon Institute of Marine Biology.
Prereq: BI 213 or BI 283H.

BI 484. Molecular Evolution. 4 Credits.
General description of patterns of molecular variation within and between species, underlying mechanisms, and methods of analysis.
Prereq: BI 320 or BI 380.

BI 488. Evolutionary Processes. 4 Credits.
Critical discussion of the ecological and evolutionary genetic processes associated with adaptation in natural populations; draws from topics in population, quantitative, and molecular genetics, molecular evolution, and statistics.
Prereq: BI 380.

BI 497M. Deterministic Dynamical Modeling in Biology. 4 Credits.
This course covers deterministic dynamical models in biology, i.e., models that describe the behavior of a biological system over time as a result of internal feedback loops and external forcings. The focus will be on differential equations, discrete-time models and related computational (programming) tools. Multilisted with MATH 497M.
Prereq: One from MATH 242, MATH 247, MATH 252, MATH 262, MATH 320; one from MATH 243, DSCI 345M, MATH 345M, MATH 461, MATH 467.

BI 499M. Stochastic Dynamical Modeling in Biology. 4 Credits.
This course covers stochastic dynamical models in biology, i.e., mathematical models that describe the behavior of non-deterministic biological systems as a result of internal feedback loops, external forcings and random processes. Topics include stochastic iterative maps, Markov chains, vector autoregression models, and time series analysis. Multilisted with MATH 499M.
Prereq: One from MATH 242, MATH 247, MATH 252, MATH 262, MATH 320; one from MATH 243, DSCI 345M, MATH 345M, MATH 461, MATH 467. Basic programming skills recommended.

BI 503. Thesis. 1-16 Credits.
Repeatable.

BI 507. Seminar: [Topic]. 1-2 Credits.
Repeatable.

BI 508. Workshop: [Topic]. 1-12 Credits.
Repeatable.

BI 510. Experimental Course: [Topic]. 1-16 Credits.
Repeatable.

BI 510L. Experimental Course: [Topic]. 4 Credits.
Repeatable.

BI 522. Protein Toxins in Cell Biology. 4 Credits.
Mechanisms used by protein toxins to kill other organisms and how they have been used as molecular scalpels to dissect pathways in cell and neurobiology. Lectures, discussions.

BI 523. Human Molecular Genetics. 4 Credits.
Advanced topics in genetics that relate to human development and disease. The human genome, sex determination, X chromosome inactivation, chromosomal abnormalities, trinucleotide repeat expansions, cancer. Lectures, discussions.

BI 526. Genetics of Cancer. 4 Credits.
Genetic regulation of cancer. Topics include oncogenes and tumor suppressor genes, signal transduction pathways, genetic animal models, and rationale treatment design. Lectures, discussions.

BI 527. Molecular Genetics of Human Disease. 4 Credits.
Advanced discussions of heritable diseases from single-gene mutations such as cystic fibrosis to complex multigenetic diseases such as autism and schizophrenia. Lectures, discussions.

BI 528. Developmental Genetics. 4 Credits.
Genetic regulation of development, including investigations of molecular mechanisms and studies of developmental mutants. Topics include molecular biology of eukaryotic chromosomes, genetic mosaics, and models of gene regulation. Lectures, discussions.

BI 532. Mycology. 5 Credits.
Physiology, ecology, structure, and classification of fungi; emphasis on structural and physiological adaptations to saprophytic, parasitic, and symbiotic modes of existence. Lectures, laboratories.

BI 533. Bacterial-Host Interactions. 4 Credits.
Examines spectrum of interactions between bacteria and animals, from pathogenesis to symbiosis, focusing on the molecular and cellular bases of these interactions. Lectures, discussions.

BI 542. Systematic Botany. 5 Credits.
Principles of plant classification with emphasis on flowering plants, introduction to taxonomic theory and methods of biosystematics, collection and identification procedures, recognition of common families in native flora. Lectures, laboratories, field trips.

BI 548. Field Botany. 4 Credits.
Intensive study of the regional flora; ecology and native uses; sight recognition of prominent species; field characteristics of principal plant families; identification using dichotomous keys. Lectures, field trips. Offered summer session only.

BI 551. Invertebrate Zoology. 1-8 Credits.
Representative invertebrate groups with emphasis on marine forms; morphology, systematics, life history, and ecology. Lectures, laboratories, field trips. Offered at Oregon Institute of Marine Biology.

BI 552. Insect Biology. 4 Credits.
Anatomy, physiology, systematics, and behavior of insects. Insect societies. Lectures, laboratories, field trips. Offered summer session only.

BI 554. Estuarine Biology. 5 Credits.
The biological and physical factors regulating abundance, distribution, production, and biodiversity within estuaries. Includes field trips to marshes, tidal flats and exploration of estuarine habitats. Offered at Oregon Institute of Marine Biology.

BI 555. Marine Birds and Mammals. 1-6 Credits.
Principles of morphology, physiology, evolution, life history, and systematics as demonstrated through study of birds and mammals of the Oregon coast. Comparison of the fauna from the open sea to coastal waters. Lectures, laboratory, field trips. Offered at Oregon Institute of Marine Biology.

BI 557. Marine Biology: [Topic]. 1-8 Credits.
Content varies. Topics include comparative embryology, environmental issues, biology of fishes, and other subjects related to marine biology. Lectures, laboratories, field trips. Repeatable when topic changes. Offered at Oregon Institute of Marine Biology.

BI 558. Biological Oceanography. 5 Credits.
Examines patterns of biological productivity and controlling physical and chemical mechanisms in the various environments of the world's oceans. Lectures, laboratories, field trips. Offered at Oregon Institute of Marine Biology.

BI 561. Systems Neuroscience. 4 Credits.
Principles of organization of nervous systems with emphasis on vertebrate brain and spinal cord. Functional implications of synaptic organization and pattern of projections, and comparative aspects. Lectures, discussions.

BI 563. Cellular Neuroscience. 4 Credits.
Physiology of excitation, conduction, and synaptic transmission. Lectures, discussions.

BI 566. Developmental Neurobiology. 4 Credits.
Mechanisms underlying development of the nervous system. The genesis of nerve cells; differentiation of neurons; synaptogenesis and neuronal specificity; plasticity, regeneration, and degeneration of nervous tissue. Lectures, discussions.

BI 568. Amphibians and Reptiles of Oregon. 4 Credits.
Field identification and understanding of ecology, biogeography, and evolution of the common herpetofauna of four major physiographic regions of Oregon. Conservation biology issues addressed. Lectures, field trips. Offered summer session only.

BI 571. Population Ecology. 4 Credits.
Theoretical, experimental and applied aspects of growth, structure, and regulation of natural populations; population estimation; demographic analysis; life-history theory. Lectures, discussions.

BI 572. Community Ecology. 4 Credits.
Quantitative and conceptual approaches to the study of biological communities. Biodiversity measurement. Effect of climate and climate change on ecosystem structure and function. Lectures, discussions.

BI 574. Marine Ecology. 1-8 Credits.
Factors that influence the distribution, abundance, and diversity of marine organisms. Field emphasis on local intertidal and shallow-water communities. Offered at Oregon Institute of Marine Biology.

BI 584. Molecular Evolution. 4 Credits.
General description of patterns of molecular variation within and between species, underlying mechanisms, and methods of analysis.

BI 588. Evolutionary Processes. 4 Credits.
Critical discussion of the ecological and evolutionary genetic processes associated with adaptation in natural populations; draws from topics in population, quantitative, and molecular genetics, molecular evolution, and statistics.

BI 597M. Deterministic Dynamical Modeling in Biology. 4 Credits.
This course covers deterministic dynamical models in biology, i.e., models that describe the behavior of a biological system over time as a result of internal feedback loops and external forcings. The focus will be on differential equations, discrete-time models and related computational (programming) tools. Multilisted with MATH 597M.

BI 599M. Stochastic Dynamical Modeling in Biology. 4 Credits.
This course covers stochastic dynamical models in biology, i.e., mathematical models that describe the behavior of non-deterministic biological systems as a result of internal feedback loops, external forcings and random processes. Topics include stochastic iterative maps, Markov chains, vector autoregression models, and time series analysis. Multilisted with MATH 599M.

BI 600M. Temporary Mulitlisted Course. 1-5 Credits.
Repeatable.

BI 601. Research: [Topic]. 1-16 Credits.
Repeatable.

BI 603. Dissertation. 1-16 Credits.
Repeatable.

BI 604. Internship: [Topic]. 1-16 Credits.
Repeatable.

BI 605. Reading and Conference: [Topic]. 1-16 Credits.
Repeatable.

BI 606. Practicum: [Topic]. 1-16 Credits.
Repeatable.

BI 607. Seminar: [Topic]. 1-3 Credits.
Topics may include neurobiology, developmental biology, ecology colloquium, genetics, molecular biology, and neuroscience. Repeatable.

BI 608. Workshop: [Topic]. 1-16 Credits.
Repeatable.

BI 609. Capstone. 1-12 Credits.
Repeatable.

BI 610. Experimental Course: [Topic]. 1-5 Credits.
Repeatable.

BI 610L. Experimental Course: [Topic]. 1-2 Credits.
Repeatable.

BI 620. Molecular Genetics. 4 Credits.
Use of modern genetic techniques to analyze gene function. Illustrates the use of model organisms including yeast, worms, flies, and mice. Covers forward genetics (function-driven gene discovery) and reverse genetics.

BI 621. Computational Methods in Genomic Analysis. 4 Credits.
An introduction to Unix shell, Python, and R programming skills for analysis of biological data sets, specifically focusing on high-throughput sequencing data.

BI 622. Genomics Techniques. 4 Credits.
Students will be introduced to various genomics laboratory techniques, as well as trained in oral and written scientific communication.

BI 623. Advanced Topics in Genomics Analysis. 4 Credits.
Exposure to a variety of topics in genomics analysis including phylogenetics, transcriptome assembly, transcript quantification, and microbial community analysis.

BI 624. Genomics Research Lab. 4 Credits.
Group research on high-throughput sequencing data.

BI 625. Advanced Genomic Analysis. 4 Credits.
Group research on high-throughput sequencing data and special topics in genomics analysis.
Prereq: BI 624.