

PROCESS BIOLOGY (PCB)

PCB 2336 - Human Genetics (3 Credits)

Basic concepts and applications of fundamental properties of human inheritance using Mendelian and molecular aspects of genetics.

Attribute(s): SUSC - Sustainability Component

PCB 3023C - Cell Biology (4 Credits)

Cellular biochemistry and physiology with in-depth study of prokaryotic and eukaryotic cellular organelles including their morphology and function. Topics include cellular mobility, growth, bioenergetics, division, communication and regulation. The curriculum is inquiry based and fully integrated with a laboratory that emphasizes active learning strategies.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (CHM 1045C or (CHM 1045 and CHM 1045L)) and (CHM 1046C or (CHM 1046 and CHM 1046L))

Attribute(s): SUSC - Sustainability Component

PCB 3043C - General Ecology (3 Credits)

Basic concepts of ecology at population, community, ecosystem, and landscape levels will be studied in integrated lectures, laboratory, and field exercises.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L))

Attribute(s): BIOE - Biology Elective, MRSE - Marine Sci Restrict Elec, SUSC - Sustainability Component

PCB 3063C - Genetics (4 Credits)

A study of the principles and theories of heredity including the gene concept, Mendelian and non-Mendelian inheritance. Basic concepts include: the nature, organization, transmission, expression, recombination and function of genetic materials. Principles are derived for genetically characterizing populations. The curriculum is inquiry based and fully integrated with laboratory experiences which emphasize active learning strategies.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and (CHM 1045C or (CHM 1045 and CHM 1045L))

Attribute(s): SUSC - Sustainability Component

PCB 3414C - Behavioral Ecology (3 Credits)

Key behavioral adaptations of invertebrates and vertebrates to their environments will be studied in integrated lectures, laboratory, and field exercises involving such topics as exploration, habitat selection, feeding, reproduction, and social behavior. The adaptive roles of innate and learned behavior will be discussed in relation to different behaviors.

Prerequisite(s): PCB 3043C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, ENVE - Envir.Stud.Elect.Pathway, MRSE - Marine Sci Restrict Elec, SUSC - Sustainability Component

PCB 3422C - Population Ecology (3 Credits)

This course involves the study of ecological principles as applied to populations and how they adjust and adapt to different abiotic and biotic factors. Topics include: population genetics, factors influencing population distributions, population regulation, intraspecies interactions, interspecies interactions, community structure, and managing populations. This course is inquiry based and fully integrated with both laboratory and field experiences which emphasize active learning strategies.

Prerequisite(s): PCB 3043C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs

PCB 3460C - Ecosystem Monit & Resea Method (3 Credits)

Overview of ecological concepts and basic methods of inventorying, monitoring, and conducting research on terrestrial, freshwater, and marine ecosystems. Emphasis on hands-on experiences. Methods will include those used in describing climatic, chemical, and physical features as well as biotic features, including field identification. The field emphasis will be on Southwest Florida ecosystems.

Prerequisite(s): PCB 3043C or ISC 3154C or ISC 3154

Attribute(s): ENVE - Envir.Stud.Elect.Pathway, MRSE - Marine Sci Restrict Elec, WBLI - Work based learning indicator

PCB 3463C - Marine Ecos Mon & Res Method (3 Credits)

Species are not distributed at random but instead occur in living communities of co-evolved populations adapted to specific physical and chemical environments. These living communities and their abiotic environments constitute ecosystems. Ecosystem structure, function, and processes will be studied in this course along with broader landscape and watershed features that influence the distribution of ecosystems in a series of integrated lectures, laboratory, and field exercises.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and ((CHM 1045C or (CHM 1045 and CHM 1045L)) or (CHM 1084C or (CHM 1084 and CHM 1084L))) and (OCE 1001C or OCE 3008C)

Attribute(s): BTEL - Biotec Restricted Elect, MRSE - Marine Sci Restrict Elec, SUSC - Sustainability Component, WBLI - Work based learning indicator

PCB 3673C - Evolutionary Biology (3 Credits)

The application of Evolutionary theory to all sub-fields of the biological sciences (e.g., medicine, ecology, molecular biology, etc.). Patterns and processes of evolution are examined, as is evidence, and the history of evolutionary theory. Application of evolutionary theory to problems is stressed, with a further emphasis on the role of phylogeny across biological discipline boundaries. This course replaces PCB 3673 effective Fall 2016.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and PCB 3063C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs

PCB 3703C - Human Physiology (4 Credits)

Students will study the organs and organ systems of the human body as they operate individually and integrate together. Special attention is devoted to cardiovascular, respiratory, neuromuscular, endocrine, renal and reproductive physiology. The curriculum is inquiry based and fully integrated with activities which emphasize active learning strategies and collaboration.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and (CHM 1046C or (CHM 1046 and CHM 1046L))

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, BTEL - Biotec Restricted Elect, BTPH - Physiology Elective, SUSC - Sustainability Component

PCB 3723C - Comparative Animal Physiology (3 Credits)

Study of the function and integration of organs and organ systems of vertebrates and invertebrates. The course and laboratory are fully integrated.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and (CHM 1046C or (CHM 1046 and CHM 1046L))

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, BTEL - Biotec Restricted Elect, BTPH - Physiology Elective, SUSC - Sustainability Component

PCB 3731 - Medical Cannabis (3 Credits)

Students will learn how cannabis affects the body. Topics covered include the endocannabinoid system; phytocannabinoid effects; pharmacology; effects of cannabis on organ systems; potential medicinal uses; and a critical evaluation of research in the field.

Prerequisite(s): PCB 3703C

PCB 4036C - Landscape & Ecosystems Ecology (3 Credits)

Species are not distributed at random but instead occur in living communities of co-evolved populations adapted to specific physical and chemical environments. These living communities and their abiotic environments constitute ecosystems. Ecosystem structure, function, and processes will be studied in this course along with broader landscape and watershed features that influence the distribution of ecosystems in a series of integrated lectures, laboratory, and field exercises.

Prerequisite(s): PCB 3043C

Attribute(s): ENVE - Envir.Stud.Elect.Pathway, SUSC - Sustainability Component

PCB 4233C - Immunology (3 Credits)

An integrated lecture/laboratory course presenting theory and basic principles of immunology including antigen- antibody reactions immunoglobulin structure, genetics, cellular immunity and immunopathology.

Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (BSC 1010C or (BSC 1010 and BSC 1010L))

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, BTEL - Biotec Restricted Elect, SUSC - Sustainability Component

PCB 4237C - Advanced Immunology (3 Credits)

The course will present principles of immunobiology including cellular and humoral immunity, serological antigen-antibody reactions, cytokine function, immune cell development and effector functions, immunogenetics, immunopathology and immunotherapy.

Prerequisite(s): PCB 4233C or (PCB 3023C and MCB 3020C)

PCB 4253C - Developmental Biology (3 Credits)

Basic developmental principles that are common to many organisms as well as those that are unique to specific organisms will be identified. The molecular mechanisms involved in the development of various eukaryotic organisms including fungi, animals, and plant will be examined.

Prerequisite(s): PCB 4522C or PCB 3023C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, BTEL - Biotec Restricted Elect, SUSC - Sustainability Component

PCB 4303C - Limnology (3 Credits)

An interdisciplinary approach to the examination of inland waters including lakes, streams, marshes, and swamps. Emphasis on the biotic, chemical and geological components of these aquatic ecosystems using Florida wetlands as models. The course is intended for students with interests in biology, environmental studies, and/or interdisciplinary natural sciences.

Prerequisite(s): PCB 3043C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, ENVE - Envir.Stud.Elect.Pathway, MRSE - Marine Sci Restrict Elec, SUSC - Sustainability Component

PCB 4304C - Freshwater Ecology of Algae (3 Credits)

This course explores the ecological role of algae and cyanobacteria in freshwater habitats. This course is intended for students interested in learning how these organisms support life through their physiological functions and issues related to freshwater harmful algal blooms.

Prerequisite(s): PCB 3043C

PCB 4442C - Wetland Ecology (3 Credits)

An interdisciplinary analysis of Earth's wetland ecosystems and the environmental issues they face. The structure and function of wetlands will be emphasized in relation to how they are impacted by human activities. Wetland regulations and management are considered.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and PCB 3043C

Attribute(s): ENVE - Envir.Stud.Elect.Pathway, SUSC - Sustainability Component

PCB 4454C - Biological Statistics (3 Credits)

This course will explore the use of statistical methodology in designing, analyzing, interpreting, and presenting biological research. It will cover descriptive statistics, elements of experimental design, probability, hypothesis testing and statistical inference, analysis of variance, correlation, regression techniques, and non-parametric statistical methods.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and (STA 2023 or STA 2037)

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, BTEL - Biotec Restricted Elect

PCB 4522C - Molecular Genetics (3 Credits)

Genetics will be investigated at the molecular level. Gene structure, function, variation, and control will be studied with respect to animal and plant cell structure and function. The curriculum is inquiry based and fully integrated with laboratory experiences which emphasize active learning strategies.

Prerequisite(s): PCB 3063C and (BCH 3023C or BCH 4033C or BCH 4033 and BCH 4033L)

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, SUSC - Sustainability Component

PCB 4656C - Molec Tech in Behavioral Biol (3 Credits)

With a major focus on DNA methodologies, the class explores the application of such techniques in the evolutionary study of Behavioral Biology, especially animal mating behavior and sexual selection. For the laboratory component, students will learn and perform the molecular and computational tools used by behavioral biologists in paternity analysis and molecular identification. These modern research methods will be considered in the context of important questions in sexual selection and mating system evolution. Topics include sexual selection, sexual conflict, sperm competition, promiscuity, female mate choice, female sperm choice, and ejaculate-female interactions.

Prerequisite(s): (BSC 1010C or (BSC 1010 and BSC 1010L)) and (BSC 1011C or (BSC 1011 and BSC 1011L)) and PCB 3063C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs

PCB 4671C - Evolution in the Omics Age (3 Credits)

The course aims at exploring the different theories and applications in current day molecular evolutionary studies and the phases of the process, including taxon and character sampling, phylogenetic methods and bioinformatics tools, diversification estimates and biogeographic reconstructions.

Prerequisite(s): PCB 3063C

PCB 4674C - Reptile & Amphibian Evolution (3 Credits)

This course provides an opportunity for advanced study of the biology of "reptiles" and amphibians in an evolutionary context. The entire spectrum of reptile and amphibian diversity is studied from the first known fossil amphibians and their ancestors through all living and extinct clades. Anatomical, physiological, and behavioral biology are also examined from an evolutionary perspective; utilizing the principles of cladistic analysis, each system is examined from its most primitive condition to the many unique derived conditions found among living and/or fossil amphibians and reptiles. Current controversies may be featured, and topics span from molecular to organismal and ecological. The course will include the use of dissection and physiological laboratory techniques to study various topics.

Prerequisite(s): PCB 3063C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, SUSC - Sustainability Component

PCB 4714 - Comparative Immunology (3 Credits)

Fundamentals of Comparative Immunology encompassing innate immunity, pattern recognition particles, host-parasite evolution and recent research discoveries will be studied.

Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and PCB 3023C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs, BTCL - Biotech Restricted Elect

PCB 4783C - Cell Membrane Physiology (3 Credits)

Chemical and physical properties of the plasma membrane. Investigation of plasma membrane biosynthesis and functions in transport and signal transduction. The curriculum is inquiry based and fully integrated with laboratory experiences that emphasize active learning strategies.

Prerequisite(s): BCH 3023C and PCB 3023C

Attribute(s): BIOE - Biology Elective, BPRO - BS Bio Pre-Pro Reqs

PCB 4870 - Sensory Biology (3 Credits)

Human and non-human animal sensory systems are studied with an emphasis on molecular, cellular, and organ structural components, transduction mechanisms, and functional outcomes.

Prerequisite(s): (PCB 3703C or PCB 3023C) and (PHY 2049C or (PHY 2049 and PHY 2049L) or PHY 2054C or (PHY 2054 and PHY 2054L))

PCB 5245 - Biology of Aging (3 Credits)

Investigation of the demographics, physiology of organ systems, evolutionary, environmental, cellular and genetic correlations of the aging process and on the resultant limitations in performance and quality of life in humans.

Prerequisite(s): BSC 1085C and BSC 1086C

PCB 5307C - Limnology (3 Credits)

Limnology is the scientific study of inland waters, which are increasingly threatened by human activities, for their biological, water quality and geological properties. This course is intended for students with interests in biology, environmental studies, or interdisciplinary natural sciences.

PCB 6041 - Ecological Modeling (3 Credits)

Introduction to modeling software and methods needed to collect, organize, and interpret data critically. For beginning graduate researchers.

PCB 6064C - Advanced Ecology (3 Credits)

Overview of major concepts in ecology with an emphasis on mathematical analytical techniques. Topics include: flows of energy and matter; temporal dynamics; community structure and dynamics; and human impact on ecosystems. Course structure includes lecture, laboratory and field studies and discussion of relevant literature.

PCB 6207C - Graduate Molec & Cell Bio (3 Credits)

This course provides an in-depth examination of established molecular cell biology and cell physiological processes, and the potential implications for the disruption of typical cell processes. Current cell and molecular biology methodologies used to elucidate molecular cell mechanisms will be detailed in this lab integrated course.

PCB 6235C - Graduate Immunology (3 Credits)

An integrated lecture/laboratory course presenting principles of immunobiology including cellular and humoral immunity, serological antigen-antibody reactions, cytokine function, immune cell development and effector functions, immunogenetics, immunopathology and immunotherapy.

Prerequisite(s): PCB 4233C

PCB 6455C - Research Design and Bio Stats (3 Credits)

This course examines different research design methodologies and the various statistical analyses that can be used in biological fields. Students learn different approaches to research and the associated quantitative analyses, emphasizing a student's ability to understand principles and assumptions of different procedures, mathematical formulas and proofs. Students also learn how to report and describe results using standards currently employed in biology.

PCB 6526C - Molecular Methods in Biology (3 Credits)

This course provides an introduction to the theoretical and practical basis for understanding key experimental techniques used in modern molecular biology research. The students receive practical hands-on experience in selected techniques. In parallel, the lectures provide molecular principles and mechanisms underlying the experimental techniques. The experimental techniques include basic recombinant DNA techniques, real time polymerase chain reaction (RT-PCR), microarray, protein analysis, recombinant protein production and purification, protein-protein interaction, protein localization, and gene transfer in eukaryotic systems. In addition, hands-on training in genomics and proteomics is provided through the use of modern bioinformatics software. The students are expected to gain critical skills to design relevant molecular experiments to address biological questions and to evaluate experimental data and conclusions.

PCB 6675C - Advanced Evolutionary Biology (3 Credits)

An advanced exploration of evolutionary theory as a unifying concept of all life science. Students will understand a detailed evolutionary framework as the basis for understanding all differences and similarities among organisms, biological patterns, and biological processes. Focus is on topics such as sexual selection, natural selection, population genetics, phylogenetics, and optimality in the study of evolutionary mechanisms. Basic theory is used in the context of applicable methodologies to study empirical evolutionary problems.

Prerequisite(s): BSC 6840

PCB 6795C - Graduate Sensory Biology (3 Credits)

Human and nonhuman animal sensory systems are studied with an emphasis on molecular, cellular, and organ structural components, transduction mechanisms, and functional outcomes. Topics will include photoreception, nonvisual photoreception, infrared imaging, magnetoreception, olfaction, gustation, pain, pheromones, audition, and electroreception.

Prerequisite(s): (PCB 3703C or PCB 3023C) and (PHY 2049C or PHY 2054C)