

PCB: Process Biology: Cell/Molecular/Ecology/ Genetics/Physiology Courses

Courses

PCB 2905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

PCB 3043 Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2011

Co-requisite: PCB 3043L

Interactions of microorganisms, plants, and animals with abiotic and biotic factors in the environment are examined as determinants of the distribution and abundance of species, population dynamics and ecosystem function. General concepts and methodologies of ecological science are discussed at individual, population, community and ecosystem levels of organization. Material and Supply Fee will be assessed for corresponding lab.

PCB 3043L Ecology Lab

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: BSC 2011L

Co-requisite: PCB 3043

This lab accompanies the Ecology lecture, PCB 3043. The lab provides students with hands-on and field experiences linked to topics presented in the lecture course and introduces students to different ecosystems on campus and in our region.

PCB 3063 Genetics

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2010/L AND BSC 2011/L

Origin, development and principles of modern genetics and genetic manipulations. Material and supply fee will be assessed for corresponding lab. Two academic terms of introductory biology are required prior to taking this course.

PCB 3063L Genetics Lab

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Co-requisite: PCB 3063

Corresponding lab for Genetics.

PCB 3097L Introduction to Human Anatomy Laboratory

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2010/L AND BSC 2011/L

Introduction to Human Anatomy is a comprehensive examination of human anatomy. The relationship between structure and function forms a continuing theme within both lecture and laboratory. This course is designed for students who intend to pursue a professional degree in health related fields. Material and Supply Fee will be assessed.

PCB 3103 Cell Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2011/L AND CHM 2210/L

Cell biology is the study of the structure and function of eukaryotic cells. The course will cover the basics of cellular function and biochemical foundations, cellular genetics and molecular biology, cell structure and function, cell signaling, and cytoskeletal organization and regulation. Relevant current topics in the news and disease case studies will also be used to more broadly apply the topics learned throughout the course to real-world situations.

PCB 3103L Cell Biology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: (BSC 2011/L OR BSC 2011C) AND (CHM 2046/L OR CHM 2046C) AND (PCB 3103*)

Cell biology Laboratory is designed to provide the fundamental training in the current techniques and methodologies used in research laboratories. The laboratory is to complement the cell biology lecture, however can be taken independently. The experiments are associated with the following topics: microscopy (bright-field and fluorescence), the scientific method, biochemistry, cellular organization, structure and function relationships, cellular energetics, biotechnology, forensic investigations, and the immunology of the wound response.

PCB 3905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

PCB 4028 Fundamentals of Pharmacology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: PCB 3103 OR BCH 3033

Pharmacology is the study of the interactions between the human body and drugs. While we will focus on medical pharmacology, the term drug encompasses endogenous molecules and natural and synthetic exogenous molecules that interact with the body. In this course, we will cover many aspects of pharmacology at the molecular and cellular levels. The course is based on learning concepts based on drug targets and understanding the cellular and molecular pathways engaged by various ligands. This course is designed for biology seniors and graduate students. The course will cover essential historical elements of pharmacology, general pharmacokinetic, quantitative aspects of drug-receptor interactions, receptor classes, and drug development. Offered concurrently with BSC 5873; graduate students will be assigned additional work.

PCB 4048C Coastal Marine Ecology

College of Sci and Engineering, Department of Biology

4 sh (may not be repeated for credit)

Prerequisite: BSC 2011/L AND CHM 2046/L

The study of nearshore coastal environments, particularly bays and estuaries emphasizing interactions among biotic communities, physical, geological and chemical processes. The influence of human activities on and management of these ecosystems is discussed. Offered concurrently with PCB 5445C; graduate students will be assigned additional work. Material and supply fees will be assessed for corresponding lab.

PCB 4098 Concepts in Human Physiology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2011/L AND CHM 2210/L

Concepts in Human Physiology is a 3 credit lecture and 1 credit lab course for students interested in areas related to human physiology. It covers physiological mechanisms of the human body. Emphasis is placed on mechanisms designed to maintain homeostatic conditions, membrane dynamics and cell signaling including endocrine and nervous signals, as well as other vital physiologic mechanisms necessary to homeostasis.

PCB 4098L Concepts in Human Physiology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: PCB 4098*

Concepts in Human Physiology is a 3 credit lecture and 1 credit laboratory course for students interested in areas related to human physiology. The laboratory portion will consist of laboratory exercises design to reinforce concepts learned in lecture. Laboratory exercises include modeling cellular activities and metabolic reactions, as well as measurements and experiments related to organ system function.

PCB 4125 Advanced Molecular Biology and Bioinformatics for Biologists

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: PCB 3063

This course uses stepwise building of computer analysis tools and techniques essential for upper-level undergraduate and M.S. graduate students in Biological Sciences, Biomedical Sciences, Biochemistry, including students with interests in pre-professional fields, as well as research in ecology, evolution, biotechnology, and medicine. In addition to the pre-requisites, we prefer that students have taken either Molecular Biology (PCB4524 and 4524L) or Biochemistry with lab (BCH 3033 and Lab) to be the most successful in the course. Offered concurrently with PCB 5525. Graduate students will be assigned additional work.

PCB 4233 Immunology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: MCB 3020 OR (CHM 2210 AND PCB 3103)

Basic principles of immunology to include humeral and cell-mediated immune mechanisms, the complement system and the inflammatory response. Offered concurrently with PCB 5235; graduate students will be assigned additional work.

PCB 4233L Immunology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: PCB 4233*

Selected experiments in immunology. Special permission required. Permission granted on the basis of fulfilling prerequisite. Material and Supply Fee will be assessed. Offered concurrently with PCB 5235L; graduate students will be assigned additional work.

PCB 4253 Developmental Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: PCB 3063 AND PCB 3103

This course covers the current understanding of the mechanisms that regulate animal development. Students will learn patterns and mechanisms of animal development, with an emphasis on model organisms such as *Drosophila*, *Xenopus*, chick, mouse, zebrafish. A central theme will be development as a phenomenon of differential gene regulation. Developmental mechanisms, especially at a molecular level, will be examined for differences and commonality among organisms, with a special focus on key signaling pathways. Specific topics include formation of early body plan, cell type determination, organogenesis, morphogenesis, stem cells, and issues in human development. Offered concurrently with PCB 5254. Graduate students will be assigned additional work.

PCB 4253L Developmental Biology Lab

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: PCB 4253*

The purpose of this course is to give students experience with important techniques used to study developmental biology, to provide hands-on learning opportunities that accompany material learned in the lecture course, and to provide research and scientific communication experience applicable to developmental biology and other biomedical research fields. Offered concurrently with PCB 5254L; graduate students will be assigned additional work.

PCB 4315 Tropical Marine Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: (BSC 2011/L OR BSC 2011C) AND (OCE 3007)

Overall, the aim of this 3-credit course is to highlight the organization, structure, productivity, and biological complexity of the marine tropical ecosystems through a field experience in the Bahamas. This course will address the taxonomy, biology, and ecology of the main groups of tropical marine ecosystems. A variety of topics including marine tropical biota, patterns of species diversity, ecology and conservation, and natural history will be covered. Special attention and focus will be given to environmental and anthropogenic disturbances. Offered concurrently with PCB 5317. Graduate students will be assigned additional work.

PCB 4364 Marine Ecological Physiology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Interdisciplinary approach to understanding and interpreting interrelationships between adaptation and environment in marine animals. Examines life history strategies and tactics unique to organisms found living in or around marine habitats. Specific behavioral and physiological responses of marine animals exposed to feeding, metabolic, osmotic, and thermal challenges are discussed. Offered concurrently with PCB 5319; graduate students will be assigned additional work.

PCB 4364L Marine Ecological Physiology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: PCB 4364*

Field techniques for quantifying physiological adaptations of marine organisms to their abiotic environment. Students will characterize marine habitats and assess feeding, metabolic, osmotic, thermal and osmoregulatory strategies used by vertebrates and invertebrates living in these habitats. Material and Supply Fee will be assessed. Offered concurrently with PCB 5319L; graduate students will be assigned additional work.

PCB 4461 Molecular Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: PCB 3063

Overall, the aim of this course is as an introduction to how developments in modern genetic techniques are used to improve our understanding of evolutionary and ecological processes. We will explore the biology of populations and communities of organisms using molecular data. Students will create, practice, and write a grant proposal in an area of their choosing as if it were submitted for external funding. Further, you will learn how these techniques can be applied to conservation and biodiversity issues. Offered concurrently with PCB 5464. Graduate students will be assigned additional work.

PCB 4524 Molecular Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BCH 3033 AND PCB 3063

Study of the molecular level of the principles governing DNA replication, repair, RNA transcription, and protein synthesis in both prokaryotes and eukaryotes. Surveys molecular processing, and recombinant DNA technology. Offered concurrently with PCB 5527; graduate students are required to write a research paper and present it to the class. Material and supply fee will be assessed to the corresponding lab. A grade of "C-" or higher is required in prerequisite courses.

PCB 4524L Molecular Biology Lab

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: PCB 4524*

Corresponding lab for Molecular Biology. Offered concurrently with PCB 5527L; graduate students will be assigned additional work.

PCB 4601 Plant Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2011/L OR BSC 2011C OR BOT 2010/L OR BOT 2010C

This course is for graduate and upper-level undergraduate students interested in learning how plants interact with their abiotic and biotic environment. The information learned in this course is broadly applicable to students interested in botany, ecology, environmental sciences, natural resources management, and conservation. Topics covered will include the history of plant ecology, soil science, and the ecology of plants at organismal, population, community, and ecosystem levels. This will combine lecture-based topics with in-class discussion of those topics, along with discussion of research articles from the peer-reviewed literature. Offered concurrently with PCB 5605; graduate students will be assigned additional work.

PCB 4673 Principles of Evolution

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: (BSC 2011/L OR BSC 2011C) AND (PCB 3063 OR PCB 3063C)

A survey of modern evolutionary biology, including the evidence that supports the theory of evolution, the natural processes that cause evolution, patterns and mechanisms of speciation, and methods for estimating evolutionary relationships. Offered concurrently with PCB 5675; graduate students will be assigned additional work.

PCB 4703 Human Physiology

College of Health, Department of Health Sciences & Admin

3 sh (may not be repeated for credit)

This course examines the physiological mechanisms of various organ systems in the human body. Emphasis is placed on transport mechanisms, renal function, hormones, respiration, cardiac function, muscle physiology, digestion, and the nervous and immune systems.

PCB 4723 Comparative Animal Physiology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2011/L

General and comparative animal physiology. Study of complex structures, phenomena, and concepts involved in regulation physiological processes employed by different groups of animals. Material and Supply Fee will be assessed for corresponding lab. Offered concurrently with PCB 5727; graduate students will be assigned additional work.

PCB 4723L Comparative Animal Physiology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: BSC 2011/L AND PCB 4723*

General and comparative animal physiology. Complex structures, phenomena, and concepts involved in the regulation of a variety of physiological mechanisms. Material and Supply Fee and Equipment Fee will be assessed. Offered concurrently with PCB 5727L; graduate students will be assigned additional work. The Comparative Animal Physiology Laboratory requires the use of living animals, in most cases invertebrates. Be mindful, that while non-mammalian animals express a relatively low level of nervous integration (i.e. they do not perceive "pain" as you and I interpret it), they should be handled carefully and treated ethically. In this regard, each experiment is designed to provide maximal educational value with minimal insult and stress to the test animal. In most cases, animals will survive the procedures. In cases where animal do not survive, the euthanasia procedures used are the most humane possible. To achieve the laboratory goals and objectives outlined here, it will be imperative that you listen carefully and follow all directions given to you by your laboratory instructors.

PCB 4841 Journey to the Brain: Brain Development and Neuronal Synapse Communication

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: (PCB 3097L AND PCB 3103) OR PCB 3063

The course will explore the human brain including development, specialized cell types, and cellular signaling pathways like long-term potentiation and long-term depression which are important for learning and memory. Ultimately, this course will give a more detailed look into how our brain synapses communicate. Offered concurrently with PCB 5846; graduate students will be assigned additional work.

PCB 4870 Sensory Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: PCB 3063 OR PCB 3063C

This course is for upper-level undergraduate students interested in learning how humans and animals sense their environments and how these senses affect behavior and survival. The information learned in this course is broadly applicable to students interested in species ecology, human and animal health, biomedical science, marine biology, general biological research and psychology. Topics covered will include sensory mechanisms important for human health as well as ecology and survival of diverse marine and terrestrial species. This will be primarily a discussion-based course analyzing classical and current research articles pertaining to discussion topics. Offered concurrently with PCB 5872; graduate students will be assigned additional and more in-depth work. Prerequisite is PCB 3063 (Genetics), however students may obtain department permission to take the course without the specified pre-requisite.

PCB 4905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

PCB 4922 Biology Seminar

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Seminar topics from a diverse spectrum of current biological research will be presented by a variety of speakers from UWF, national and international academic research instructors and agencies. Offered concurrently with PCB 5924; graduate students will be assigned additional work.

PCB 5235 Immunology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

The basic principles of immunology will be addressed. Immune-mediated disease processes will be discussed. Offered concurrently with PCB 4233; graduate students will be assigned additional work.

PCB 5235L Immunology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Selected experiments in immunology. Permission is required. Permission granted on the basis of fulfilling prerequisite or co-requisite. Material and supply fee will be assessed. Offered concurrently with PCB 4233L; graduate students will be assigned additional work.

PCB 5256 Developmental Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course covers the current understanding of the mechanisms that regulate animal development. Students will learn patterns and mechanisms of animal development, with an emphasis on model organisms such as *Drosophila*, *Xenopus*, chick and mouse. A central theme will be development as a phenomenon of differential gene regulation. Developmental mechanisms, especially at a molecular level, will be examined for differences and commonality among organisms, with a special focus on key signaling pathways. Specific topics include formation of early body plan, cell type determination, organogenesis, morphogenesis, stem cells, and issues in human development. Graduate students will be assigned outside reading from the primary literature on current research topics in developmental biology and will be expected to summarize and critique these papers orally and in writing. Students will also write a term paper that clearly, thoroughly and effectively summarizes a current topic in the field of developmental biology. Offered concurrently with PCB 4253; graduate students will be assigned additional work.

PCB 5317 Tropical Marine Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Overall, the aim of this 3-credit course is to highlight the organization, structure, productivity, and biological complexity of the marine tropical ecosystems through a field experience in the Bahamas. This course will address the taxonomy, biology, and ecology of the main groups of tropical marine ecosystems. A variety of topics including marine tropical biota, patterns of species diversity, ecology and conservation, and natural history will be covered. Special attention and focus will be given to environmental and anthropogenic disturbances. Offered concurrently with PCB 4315. Graduate students will be assigned additional work.

PCB 5319 Marine Ecological Physiology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Co-requisite: PCB 5319L

Interdisciplinary approach to understanding and interpreting interrelationships between adaptation and environment in marine animals. Examines life history strategies and tactics unique to organisms found living in or around marine habitats. Specific behavioral and physiological responses of marine animals exposed to feeding, metabolic, osmotic, and thermal challenges are discussed. Offered concurrently with PCB 4364; graduate students will be assigned additional work.

PCB 5319L Marine Ecological Physiology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Co-requisite: PCB 5319

Field techniques for quantifying physiological adaptations of marine organisms to their abiotic environment. Students will characterize marine habitats and assess feeding, metabolic, osmotic, thermal and osmoregulatory strategies used by vertebrates and invertebrates living in these habitats. Material and supply fee will be assessed. Offered concurrently with PCB 4364L; graduate students will be assigned additional work.

PCB 5445C Coastal Marine Ecology

College of Sci and Engineering, Department of Biology

4 sh (may not be repeated for credit)

The study of nearshore coastal environments, particularly bays and estuaries emphasizing interactions among biotic communities, physical, geological and chemical processes. The influence of human activities on and management of these ecosystems is discussed. Offered concurrently with PCB 4048C; graduate students will be assigned additional work. Material and supply fees will be assessed for corresponding lab.

PCB 5464 Molecular Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Overall, the aim of this course is as an introduction to how developments in modern genetic techniques are used to improve our understanding of evolutionary and ecological processes. We will explore the biology of populations and communities of organisms using molecular data. Further, you will learn how these techniques can be applied to conservation and biodiversity issues. Offered concurrently with PCB 4461. Graduate students will be assigned additional work usually in the form of an additional written report(s).

PCB 5525 Advanced Molecular Biology and Bioinformatics for Biologists

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course uses stepwise building of computer analysis tools and techniques essential for upper-level undergraduate and M.S. graduate students in Biological Sciences, Biomedical Sciences, Biochemistry, including students with interests in pre-professional fields, as well as research in ecology, evolution, biotechnology, and medicine. Graduate students will be assigned additional work that supports more advanced skills with analysis and presentation of findings.

PCB 5605 Plant Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course is for graduate and upper level undergraduate students interested in learning how plants interact with their abiotic and biotic environment. The information learned in this course is broadly applicable to students interested in botany, ecology, environmental sciences, natural resources management, and conservation. Topics covered will include the history of plant ecology, soil science, and the ecology of plants at organismal, population, community, and ecosystem levels. This will combine lecture-based topics with in-class discussion of those topics, along with discussion of research articles from the peer-reviewed literature. Offered concurrently with PCB 4601; graduate students will be assigned additional work. Credit cannot be earned in both the undergraduate and graduate-level courses.

PCB 5675 Principles of Evolution

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

A survey of modern evolutionary biology, including the evidence that supports the theory of evolution, the natural processes that cause evolution, patterns and mechanisms of speciation, and methods for estimating evolutionary relationships. Offered concurrently with PCB 4673; graduate students will be assigned additional work.

PCB 5727 Comparative Animal Physiology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

General and comparative animal physiology. Study of complex structures, phenomena, and concepts involved in regulation physiological processes employed by different groups of animals. Material and Supply Fee will be assessed for corresponding lab. Offered concurrently with PCB 4723; graduate students will be assigned additional work.

PCB 5846 Journey to the Brain: Brain Development and Neuronal Synapse Communication

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

The course will explore the human brain including development, specialized cell types, and cellular signaling pathways like long-term potentiation and long-term depression which are important for learning and memory. Ultimately, this course will give a more detailed look into how our brain synapses communicate. Offered concurrently with PCB 4841; graduate students will be assigned additional work.

PCB 5872 Sensory Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course is for graduate students interested in learning how humans and animals sense their environments and how these senses affect behavior and survival. The information learned in this course is broadly applicable to students interested in species ecology, human and animal health, biomedical science, marine biology and general biological research. Topics covered will include sensory mechanisms important for human health as well as ecology and survival of diverse marine and terrestrial species. This will be primarily a discussion-based course analyzing classical and current research articles pertaining to discussion topics. Offered concurrently with PCB 4870; graduate students will be assigned additional and more in-depth work.

PCB 5905 Water Quality

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

PCB 5924 Biology Seminar

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Seminar topics from a diverse spectrum of current biological research will be presented by a variety of speakers from UWF, national and international academic research instructors and agencies. Offered concurrently with PCB 4922; graduate students will be assigned additional work.

PCB 6074 Experimental Design in Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Covers experimental design in relation to the analysis of biological data. Topics include sources of error, variation in biological systems, replication and pseudoreplication, controls, multiplicity, sample size and randomization. The physical layout of biological experiments in the field and laboratory will be discussed in relation to basic parametric data analysis techniques.

PCB 6905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

PCB 6971 Thesis

College of Sci and Engineering, Department of Biology

1-6 sh (may be repeated for up to 12 sh of credit)

Graded on satisfactory / unsatisfactory basis only. Permission is required.

* This course may be taken prior to or during the same term.