

BS: Biology

Neuroscience Emphasis—26

BIOL371, 372, 449, 495 (2 cr), ZOOL468, 484, three upper division electives from Biology, Psychology or BCHM422

Behavior/Mathematics Emphasis—28

BIOL371, 372, 449, 495 (2 cr), ZOOL484, MATH141, 142, 426, STAT340

BS: Psychology

Behavioral Neuroscience—24 + 3 Gen. Ed.

General Education—PSYC101

PSYC433, 434, 460, 465, four upper division electives from Biology, Mathematics or Psychology

BIOLOGY

Price Hall, Room 216
(269) 471-3243

Botany Emphasis—18

Upper-division biology courses; must include a botany course (BOT prefix) drawn from each of the environmental, morphological, and functional groups of courses listed below. In addition, one zoological course (ZOOL prefix) must be included.

Zoology Emphasis—18

Upper-division biology courses; must include a zoology course (ZOOL prefix) drawn from each of the environmental, morphological, and functional groups of courses listed below. In addition, one botany course (BOT prefix) must be included.

Biomedical Emphasis—13-14

Must include four of the following: ZOOL315, 464, 465, BIOL475; or PHTH 417, 427. BCHM421 must be included in the cognate core.

Molecular Biology Emphasis—12-13

Must include BIOL418, 419, 445, 447, and **one** of the following four courses: BIOL475; BIOL444, 446; ZOOL315; BOT470 or ZOOL464. BCHM421 must be included in the cognate core.

Neurobiology Emphasis—14

Upper-division biology courses; must include a zoology course (ZOOL prefix) drawn from each of the environmental, morphological, and functional groups of courses listed below. In addition, ZOOL475 and either PSYC364 or 449 must be taken. BCHM422 must be included in the cognate core.

Special Emphasis—18

In situations where students are preparing for a specific job opportunity or a graduate or professional program, the special emphasis may be considered if other degree programs are not adequate. The credits must include one biology course each from the functional, morphological, and environmental courses listed below. Additional credits to reach a minimum of 18 are to be selected from courses in biology or other disciplines in consultation with a Biology Department advisor. Departmental approval must be received before the beginning of the spring semester of the student's junior year.

Behavior/Mathematics Emphasis—28

BIOL371, 372, 449, 495 (2 cr), ZOOL484, MATH141, 142, 426, STAT340

Neuroscience Emphasis—26

See p. 109.

Minor in Biology—22

BIOL165, 166, 449 and one course each from environmental, morphological, and functional biology electives.

Minor in Environmental Sciences—28

Suggested electives chosen in consultation with the advisor include: BHSC450, BIOL479, 487, BOT468, 475, CHEM340, GEOG240, PLSC425, ZOOL454, 458, 459, 484

SENIOR THESIS

A minimum of 3 credits of BIOL495 or HONS497. Biology majors may elect to complete a minimum of 3 credits of original research in a topic of mutual interest with a Biology Department staff

member and present this original work in the form of a senior thesis. This research experience may be supported by a research scholarship.

ET/Ed/Ch/Ph/Le/Ill/mo/edu/fB/Of/e/g/b/g/i/D/C/N/E/i/f/a/t/i/c/P/H/B/G/J/H/S To 6ndgheine

those not requiring the depth offered in BIOL111, 112. Meets the natural science elective course requirement. Two lectures, one lab per week. Does not apply to a major or minor.

BIOL111, 112, 113 \$ (4, 3, 1)

BIOL111 and 112 includes cell biology, functional anatomy and control of each organ system of the human. BIOL111 Weekly: 3 lectures and 1 lab; BIOL112 Weekly: 2 lectures and 1 lab; BIOL113 Weekly: 1 lecture and 1 lab, includes more detailed anatomy. BIOL111 is a prerequisite for BIOL112. BIOL112 or consent of the instructor is the prerequisite for BIOL113. Does not apply to a major or minor. BIOL111: ; BIOL112: ; BIOL113.

BIOL208 \$ (4)

Study of basic ecological principles as applied to human activities. Discussions deal with contemporary environmental issues. Lab includes field trips, guest speakers, and experiments. Meets General Education science requirements for non-science majors and applies toward the environmental science major and certain state educational certification requirements. Weekly: 3 lectures and 1 lab.

BIOL260 \$ (4)

Includes history, morphology, classification, control, growth, transmission, and pathogenicity of selected bacteria, viruses, rickettsia, fungi, and parasites. Covers the nature of host defenses against pathogens, including the acquisition of specific immunity and immune disorders. Weekly: 3 lectures and two 1½ hour labs. Does not apply on major or minor.

BIOL330 \$ (3)

Survey of fundamental concepts of geology and paleontology with application to a study of the history of the earth and of life. Consideration is given to interactions of religious, philosophical, and geological ideas, within a biblical world view. Weekly: 2 lectures and 1 lab. Does not apply to a major or minor.

REQUIRED CORE

BIOL165, 166 \$ (5, 5 or 4, 4)

Provides a firm foundation for students majoring or minoring in the biological sciences. Weekly: 5 lectures and one 3-hour lab. Ten credits when offered during the academic year; 8 credits when offered at the Marine Biological Station during the summer. BIOL165: ; BIOL166:

BIOL348 \$ (3)

Ecological principles as applied to individual, population, community, and ecosystem levels of organization. Labs feature the characterization of ecological systems using standard field and lab techniques. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL165, 166 or 208.

BIOL371 \$ (3)

Mechanisms of heredity are considered in light of classical population and molecular genetics. Labs feature experience in genetics, chromosome analysis, statistical techniques, and recombinant DNA technology. Weekly: 2 lectures and 1 lab.

Prerequisite: BIOL166, and completion of or simultaneous enrollment in CHEM131.

BIOL372 \$ (3)

Information from molecular biology, biochemistry, biophysics, physical chemistry, and electron microscopy are integrated to present the cell as a functional unit. Labs provide experience in the collection and analysis of quantitative data about cells. Weekly: 2 lectures and 1 lab. Prerequisite: BIOL166, and completion of or simultaneous enrollment in CHEM132.

BIOL449 \$ (3)

Examination of biological, paleontological, and geological concepts central to the study of historical events in biological systems. Considers the interactions of data, theories, and extra scientific concepts in historical biology, within the particular context of a biblical world view. Weekly: 2 lectures and 1 lab. Prerequisite: BIOL166.

BIOL451, 452 (1, 1)

Lectures, discussions, and individual work centered around asking and answering important questions in the life sciences: research in biology, discussions on important issues in origins; discussions on major topics in bioethics. Attendance at monthly research seminars required. Open to senior Biology majors. Weekly: 1 lecture. BIOL451: ; BIOL452:

ELECTIVES

(Elective courses offered at the Marine Biological Station may be included under these electives.)

BIOL208 \$ (4)

Study of basic ecological principles as applied to human activities. Discussions deal with contemporary environmental issues. Lab includes field trips, guest speakers, and experiments. Meets General Education science requirements for non-science majors and applies toward the environmental science major and certain state educational certification requirements. Weekly: 3 lectures and 1 lab.

BIOL479 ◆ (3.5)
(offered only at Marine Station)

A study of interspecific, intraspecific, and community relationships demonstrated by marine organisms.

BIOL487 ◆ \$ (3)

The distribution of plants and animals in relation to their environment, including consideration of major biogeographic regions of the world and the role of distribution in adaptive change and diversification of life in the past and present. Weekly: 2 lectures and 1 conference period. (odd years)

BOT450 ◆ \$ (3)

Designed as an interface between botany, medicine, anthropology and pharmacology to define the impact plants have with the remedial, harmful or psychoactive health of humans. Weekly: 3 lectures & 1 lab. Prerequisites: BIOL112.

BOT468

◆ (3.5)

(offered only at Marine Station)

A systematic study of marine plants found in Puget Sound, with a

BIOL446 ◆ \$ (2)

Lab preparation of tissues for transmission and scanning electron microscopy with hands-on experience with the ultramicrotome and both T.E.M. and S.E.M. instruments. Acceptable photographs with interpretations required with lab reports on appropriate research projects. Weekly: 2 labs. Prerequisite: Prior or concurrent registration in BIOL444. (odd years)

BIOL447 ◆ \$ (3)

Study of theory, application, and techniques useful for propagating tissues in the research laboratory. Topics include sterile techniques, nutrition, media preparation, establishment and maintenance of primary and secondary cultures, enumeration, and analysis. Weekly: 2 lectures and 1 lab. Prerequisite: BIOL166. Pre- or corequisite: CHEM231. (even years)

BIOL450 ◆ \$ (3)

A study of the mechanisms of actions of psychotropic agents and how they affect human perception and behavior. Emphasis is placed on the organization and function of the nervous system and the molecular and biochemical basis of drugs used to treat behavioral and clinical disorders. Weekly: 2 lectures and one 3-hour lab. Prerequisites: PSYC101 or 180; BIOL111,112 or BIOL165, 166.

BIOL475 ◆ \$ (3)

Study of the properties of bacteria that illustrate their function and relationship to other living systems. Topics include structure and function, classification, and interaction with the environment. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL166. Organic Chemistry background recommended.

ZOOL425 ◆ \$ (3)

Emphasis on better known parasites of humans and animals. Attention given to ecological factors concerned with host-parasite contact, pathogenicity and pathology, and treatment and effect on parasitized populations. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL166.

ZOOL475 ◆ \$ (3)

The neural basis of behavior, with some emphasis on the human nervous system, including cellular and molecular approaches to neuron function, development of neurons and circuits, and neuroendocrine mechanisms. Labs develop skills in electrophysiology and neuroanatomy. Weekly: 2 lectures and 1 lab. Prerequisite: BIOL166.

RESEARCH AND SPECIALIZED STUDIES

BIOL405 (1-4)

Investigates various specialties of biology. Repeatable in different areas.

BIOL590 (1-4)

Investigates various specialties of biology. Repeatable in different areas.

BIOL648 (1-4)

BIOL681, 682 (1, 1)

An introduction to graduate studies in biology, the nature and methods of science, and principles of research ethics. During second semester reports are made by each student to the group on topics from current literature and on specific problems in biology. Participation once per week for 2 semesters is required. BIOL681: ; BIOL682:

BIOL697 (1-4)

Repeatable to 4 credits.

BIOL699 (3)

Repeatable to 6 credits.

CHEMISTRY AND BIOCHEMISTRY

Halenz Hall, Room 225
(269) 471-3247 or 471-3248
chemistry@andrews.edu
<http://www.andrews.edu/CHEM/>

Faculty

G. William Mutch,
David E. Alonso
Getahun Merga
Desmond H. Murray
D. David Nowack
Steven E. Warren
Peter A. Wong

Students who plan to major in chemistry or biochemistry are expected to have entrance credit in the preparatory subjects of chemistry and mathematics (including algebra and trigonometry); a background in physics is desirable. Those who do not have entrance credit or equivalent training in these subjects, pa4 ot IfCrl Dathematics ,matynot hfulflithe pdparatmnt traduateon oequired