

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

BS: P

BIOLOGY

Price Hall, Room 216
 269-471-3243
biology@andrews.edu
www.andrews.edu/biology/

David A. Steen, *Chair*
 Gordon J. Atkins
 Bill Chobotar
 H. Thomas Goodwin
 James L. Hayward
 David N. Mbungu
 Marlene N. Murray
 John F. Stout
 Dennis W. Woodland
 Robert E. Zdor

A	
BS: Biology	
Behavior/Mathematics	67
Biomedical	37-38
Botany	42
Molecular Biology	36-37
Neurobiology	38
Neuroscience	67
Special	42
Zoology	42
Minor in Biology	22
Minor in Environmental Sciences	28
MS: Biology	30
MAT: Biology	

M

The program in Biology is centered in the study of life within the context of a Seventh-day Adventist Christian worldview. Perception of the Creator through His creation, the ethical use of individual gifts in caring for creation and personal balance through self-understanding are encouraged.

Accordingly, students in Biology are challenged through thoughtful, inquisitive study:

- to understand life's basic processes through scholarship and research,
- to understand their place in the scheme of creation,
- to grow in analytical and creative abilities,
- to prepare for skilled, productive service in biological, medical and related disciplines, and
- to find through Spirit-centered study and service, greater personal integrity and a strengthened faith commitment.

Each degree offered by the Department of Biology includes a common core curriculum and additional courses tailored to students' special needs.

Highly motivated students may compete for the Biology Undergraduate Research Traineeship (BURT) program. For full details, consult the Biology Department.

U a a P a

BS: B

All biology majors must complete the following core and cognate courses:

BIOL165, 166, 348, 371, 372, 449, 451, 452.

CHEM131, 132, 231, 232, 241, 242; PHYS141 & 142 or 241/271 & 242/272

RELT340, PSYC101 or PSYC180. Students taking the Honors Core do not need RELT340.

Students must complete the biology core, the cognate core, and the requirements for one of the emphases listed on the following page.

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.

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.

Must include four of the following: ZOOL315, 464, 465, BIOL475; or PHTH417, 427. BCHM421 must be included in the cognate core.

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.

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.

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 Department of Biology advisor. Departmental approval must be received before the beginning of the spring semester of the student's junior year.

See p. 122.

See p. 121.

M B (22)

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

M E a S (28)

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

S T

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

G a a P a

The Department of Biology offers courses leading to the Master of Science degree and also cooperates with the School of Education in offering courses leading to the Master of Arts in Teaching degree. Students are strongly urged to incorporate into their programs a summer of study at the Rosario Beach Marine Station at Anacortes, Washington. During the 8-week summer session, students may earn 6 to 8 credits.

The Department of Biology collaborates in offering the MS: Mathematics and Science with the departments of Mathematics, Chemistry, and Physics. See the program description under Mathematics and Science, p. 171.

MS: B

In addition to the general requirements for admission to and enrollment in graduate degree programs outlined in this bulletin on pp. 47-56, students must meet the following departmental requirements.

A

- A bachelor's degree with major in biology or an approved,

- A final

study tour is announced. A maximum of 6 credits may be applied to a graduate or undergraduate degree in biology.

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

G □ A: E

P
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. *Fall, Spring*

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

B
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. *Spring* (odd years)

Med
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. *Spring*

Ma
A systematic study of marine plants found in Puget Sound, with a survey of marine plants from other areas. *Summer*

B
A taxonomic and morphological study of vascular plants emphasizing the plants found in the Great Lakes area. Field trips. Weekly: 3 lectures and 1 lab. Open to non-science majors. *Fall*

Ve
Covers the various specialties of vertebrate biology, including herpetology, ornithology, and mammalogy. Repeatable in the different specialized areas. Open to non-science majors. Weekly: 2 lectures and 1 or 2 labs. *Vertebrate Zoology: Mammalogy* (Fall, even years) and *Vertebrate Zoology: Ornithology* (Spring, even years) both qualify as "S" courses for General Education Service Learning.

Ma
Biology of invertebrates studied in the marine environment of Puget Sound. A survey of the various phyla is conducted

by studying the living animals in the field, and by tide pool observation, dredging, and scuba diving. A project on a specific group or species is required. *Summer*

E
Study of the fundamental aspects of insect biology. Weekly: 2 lectures and 1-2 labs. *As scheduled*

G □ B: M
P
Covers various specialties including History of Life; Vertebrate Paleontology; Paleobiology of Dinosaurs. Origins, history, adaptations, diversity, and paleoecology of ancient organisms as documented by the fossil record. Repeatable in different areas. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL166. *Fall* (odd years)

P
A study of cell and tissue structure and organ development in vascular plants. Weekly: 2 lectures and 1 lab. *As scheduled*

A
A study of the cellular and tissue-level events that result in the development of integrated organisms. Vertebrate development is emphasized in the lab using frog and chick models. Weekly: 2 lectures and 1 lab. Prerequisite: BIOL166. *Spring*

H
Acquaints students with the process of human development and embryology. Prerequisite: BIOL166. Prior or concurrent registration with ZOO315 recommended. Weekly: 1 lecture. *Spring*

H
Microscopic anatomy, cytology, ultrastructure of tissues and organ systems are correlated with function. Emphasis on normal tissues of vertebrates. Weekly: 2 lectures and 1 lab. *Spring*

G □ C: F
I
Topics include organs and cells of the immune system, antigens, immunoglobulins, the MHC, antibody diversity, tolerance and memory, complement, cell mediated immunity, regulation, hypersensitivity, autoimmune diseases, transplantation, and tumor immunology. Weekly: 2 lectures. Prerequisites: BIOL166. *Spring*

I
I
A theoretical and practical study of techniques used in modern immunology. Includes immunoserological methods; isolation and detection of immunoglobulin molecules in immune serum by



