College of Arts and Sciences

Department of Biology

Faculty

James A. Huggins (1987). Professor of Biology and Department Chair. B.S.A. and M.S., Arkansas State University; Ph.D., University of Memphis; Additional study, University of Tennessee at Memphis.

Chereyl Crossett (1992). Instructor of Biology Laboratories. B.S., Union University; M.A., Western Kentucky University; Additional study, Boston University and Portland State University.

Michael L. McMahan (1980). Professor of Biology. B.S. and M.S., University of Mississippi; Ph.D., Louisiana State University.

Brian Norton (1994). Instructor of Biology. B.S., Union University; M.S., Illinois State University; Additional study, Illinois State University.

Elsie Y. Smith (1962). Associate Professor of Biology. B.S., Union University; M.S., University of Illinois; Additional study in Radiation Biology, University of Tennessee at Memphis.

Wayne Wofford (1987). Associate Professor of Biology and Director for the Center of Scientific Research and the Christian Faith. B.S., Union University; M.S. and Ph.D., Texas A & M University.

The curriculum in biology is designed to acquaint students with living organisms as whole, functioning entities that, in their diversity, share many common features. In addition to providing the scientific background required of all educated citizens, the courses provide a foundation upon which the student may build a graduate program, undertake training in health-related professions, or prepare for secondary-level science teaching. Students may participate in independent research as well as specific courses.

Major in Biology

Because contemporary biology leans heavily on mathematics and physical sciences, the student majoring in biology should include introductory mathematics and chemistry in the freshman year. The beginning biology course should be Principles of Biology, where the student will build a foundation for future study of biological processes. With this preparation, the student can proceed to the first 200-level biology course during the second semester of the freshman year. In the sophomore year, the student should continue his/her survey of the kingdoms of life by taking additional 200-level biology courses. He/she should also strengthen his/her understanding of mathematics and obtain a background in organic chemistry during that year. Biology courses at the 300-400 level should be taken during the junior and senior years, with research and seminar reserved for the senior year. In these courses the student will examine in detail how organisms function, as well as how they interact with their environment and each other. Biology majors are encouraged to minor in chemistry.

The curriculum requirements for biology majors are as follows:

Major in Biology—38 hours

A. BIO 112
B. Four 200 level courses (211, 213, 214, and 215)
C. Five 300 level courses (must include 301, 302 and 315 and exclude Special Studies)
D. BIO 424
E. BIO 498 during the senior year
F. Biology Elective (Four of the eight hours taken in BIO 221-222 may be counted if both 221 and 222 are taken.)
Assessment of Majors

Biology students are required to take two terminal courses as a requirement for graduation with a biology major, BIO 424, Research, and BIO 498, Seminar. The Biology Department also administers the Major Fields Examination in Biology to senior biology majors.

Minor in Biology

The student minoring in biology should begin his/her course work with Principles of Biology. He/she will then take several selected courses from the biology curriculum. It is recommended that these courses be chosen in light of the student’s specific career objective.

The curriculum requirements for biology minors are as follows:
Minor in Biology—24 hours
A. BIO 112
B. BIO 211, 315, and one additional 300-level course
C. Eight additional hours

Teacher Licensure (Grades 7-12)

Consult the Biology Department or the Education Department for professional education requirements.

Student Organization

Sigma Zeta is a national honorary science society for those who have completed fifteen hours in natural science and mathematics and who have a minimum grade point average of 3.0 in these courses. Membership advantages include recognition for academic achievements by the Sigma Zeta Honor Award, participation in nationally recognized research projects, and a means of cooperation in similar areas of interest by students of different colleges.

Student Awards

Academic Excellence Medals. This award is given to the graduating major who has the highest academic average in the discipline, provided the average grade in the subject is not less than 3.5 and provided the student has completed, before Awards Day, a minimum of 15 credit hours in the discipline at Union University in courses for which precise grades are computed (as distinguished from courses graded pass or fail). If there is no eligible major in the discipline, the medal will be given to the minor with the highest average if the above qualifications are met.

Whiteaker Freshman Biology Award. Each year the Biology Department selects a freshman biology major or minor to receive this award, which is based on outstanding scholastic achievement, financial need, Christian service, and school spirit.

Course Offerings in Biology (BIO)

() Hours Credit: F-Fall; W-Winter; S-Spring; Su-Summer

100. Survey of Biological Concepts (4) F, W, S
A course designed for non-science majors and focused on the basic ideas of biology in a way that will enable students to appreciate the living world and their relationship to it. Includes topics such as the cell, genetic basis of life, biodiversity, a survey of the five kingdoms of life, ecology, and the environment. Three hours of lecture and two hours of laboratory per week. No credit toward science majors or minors.

112. Principles of Biology (4) F, S
A study of the basic characteristics of organisms, dealing with structure, function, reproduction, and ecology. An introductory course which partially fulfills the science requirements for gradu-
ation. Three hours of lecture and two hours of laboratory per week.

211. Microbiology (4) F, S
A study of the classification, morphology, physiology, and ecology of bacteria, blue-green algae, rickettsiae, and viruses, with special emphasis on bacteria. Three hours of lecture and three hours of laboratory per week. Prerequisite: CHE 105 or 111, or PHY 111, and BIO 112. Nursing students may substitute BIO 221 and 222 for BIO 112.

213. Invertebrate Zoology (4) F
A study of the classification, morphology, physiology, and ecology of the invertebrate animals. Three hours of lecture and three hours of laboratory per week. Prerequisite: BIO 112.

A study of the classification, morphology, physiology, and ecology of the vertebrate animals. Three hours of lecture and three hours of laboratory per week. Prerequisite: BIO 112.

215. Botany (4) F
A study of the classification, morphology, physiology, and ecology of the algae, fungi, bryophytes, and vascular plants. Three hours of lecture and three hours of laboratory per week. Prerequisite: BIO 112 and CHE 111.

221. Human Anatomy and Physiology (4) F, Su
A two-semester course designed to meet the needs of nursing, physical education, special education, and allied health students. Others may enroll if space is available. Body systems studied include the integumentary, cardiovascular, lymphatic, skeletal, and muscular. Three hours of lecture and two hours of laboratory per week. No credit toward biology minor. Four hours may be counted toward a biology major if both 221 and 222 are taken.

222. Human Anatomy and Physiology (4) S, Su
A continuation of BIO 221. Body systems studied include the urinary, nervous, endocrine, digestive, and respiratory. No credit toward a biology minor.

300. Pathophysiology (3) W
This course will build on foundations established in previous science and nursing courses to facilitate further comprehension of the various states of altered health observed within the health care arena. Topics such as stress, shock, altered acid-base balance, altered fluid and electrolyte balance, neoplasia, hypertension, immunodeficiency, genetic disorders, altered cardiac rhythms, renal failure, and uremia can be expected to be addressed. No credit towards biology major or minor. Prerequisite: BIO 221 and 222, BIO 211.

301. Research Presentation Attendance (0) F, S
Students are required to attend all research presentations made by students enrolled in BIO 424 during the semester. Must be taken before enrolling in BIO 424. Prerequisites: 12 hours of biology. Graded on a pass/fail basis.

302. Seminar Attendance (0) F, S
Students are required to attend all seminar presentations made by students enrolled in BIO 498 during the semester. Must be taken before enrolling in BIO 498. Prerequisites: 12 hours of biology. Graded on a pass/fail basis.

312. Comparative Vertebrate Anatomy (4) S
Odd Years
A study of the similarities of anatomy and early development of the vertebrates, complemented by dissection of representative adults. Three hours of lecture and three hours of laboratory per week. Prerequisite: BIO 112 and 214, plus four additional hours of biology, excluding BIO 221 or BIO 222.

315. Genetics (4) S
A study of the principles of heredity including both classical and molecular genetics. Three hours of lecture and three hours of laboratory per week. Prerequisite: 12 hours of biology, excluding BIO 221 or BIO 222, or permission of instructor.

316. Physiology (4) S
A study of the principles of physiology, emphasizing metabolic processes common to many organisms. Three hours of lecture and three hours
of laboratory per week. Prerequisite: 12 hours of biology, excluding BIO 221 or BIO 222, and CHE 106 or 314, or permission of instructor. A zoology course is recommended.

317. Developmental Biology (4) W — Even Years
A study of development in organisms, including both classical, descriptive embryology and contemporary investigations of processes involved in morphogenesis and differentiation. Three hours of lecture and three hours of laboratory per week. Prerequisite: 12 hours of biology, excluding BIO 221 or BIO 222, or permission of instructor. A zoology course is recommended.

318. Ecology (4) S — Even years
A study of the interactions between organisms and their biological and physical environments. Three hours of lecture and three hours of laboratory per week. Prerequisite: 12 hours of biology, excluding BIO 221 or BIO 222, or permission of instructor.

319. Biochemistry (4) S
An introductory survey of chemical reactions in living systems. Three lectures and one three-hour laboratory per week. Reciprocal credit in Chemistry. Primarily for science majors. Prerequisite: BIO 112, CHE 315, and CHE 325.

320. Immunology (4) F
A fundamental course dealing with principles of immunity and the mechanism of the immune response. Laboratory emphasis is on serology and transplantation immunology. Three hours of lecture and three hours of laboratory per week. Prerequisite: BIO 211 and CHE 314, and eight additional hours of biology, excluding BIO 221 and BIO 222, or permission of instructor.

195-6-7. Special Studies (1-4) On Demand
Lower-level group studies which do not appear in the regular departmental offerings.

395-6-7. Special Studies (1-4) On Demand
Upper-level group studies which do not appear in the regular departmental offerings.

424. Research (2) F, S
The student’s knowledge is integrated by a piece of original research in an area of his/her choice. Minimum of six hours per week of time spent on project. Prerequisite: 28 hours completed toward the biology major and a minimum biology GPA of 2.0.

495-6-7. Independent Study (1-4) On Demand
Individual research under the guidance of a faculty member.

498. Biology Seminar (1) F, S
A course that involves the writing and oral presentation of a library research paper in addition to weekly discussions of current biological research. May be modified at the discretion of the department. One meeting of one hour per week. Prerequisite: 28 hours completed toward the biology major, a minimum biology GPA of 2.0, plus senior standing.

Upper-level biology students may enroll in marine biology courses taught at the Gulf Coast Research Laboratory during the Summer. For information, see the Biology Department Chairman.