

DEPARTMENT OF BIOLOGY

COLLEGE OF ARTS AND SCIENCES

Faculty

Mark Bolyard (2006). University Professor of Biology and Department Chair. B.A., Hanover College; Ph.D., University of North Carolina; Additional study, Michigan State University; Penn State College of Medicine.

Jeremy Blaschke (2015). Assistant Professor of Biology. B.S., Bryan College; M.S. and Ph.D., University of Tennessee, Knoxville.

Euna (Esther) Choi

Instructional Staff

Juliana Cobb (2017). Laboratory Specialist. B.S., Union University; M.S., East Carolina University.

Lisa Conway (2012). Laboratory Specialist. B.S. and D.V.M., Texas A&M University.

Cathy Huggins (2009). Laboratory Specialist. B.S. and B.S.M.T., Arkansas State University; M.B.A., Union University.

Robert Wamble (2011-2015, 2017). Laboratory Specialist, Director for Anatomical Services and Director for Plastination. B.S., University of Tennessee; D.V.M., Auburn University.

Staff

Frances Lancaster (2016). Academic Secretary–Biology and Chemistry. B.A., Rhodes College; Johan Wolfgang Goethe University, Frankfurt, Germany.

Curriculum

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

University of Memphis.

Janaia Poppellwell

(2008). Assistant Professor of Biology.

B.S. and M.A.Ed., Union University; M.S., Mississippi State University.

Michael Schiebout (2012). Associate Professor of Biology. B.A., Dordt College; M.S. and Ph.D., University of Northern Colorado.

William Thierfelder (2014). Associate Professor of Biology and Director of the Hammons Center for Scientific Studies. Sc.B, Brown University; Ph.D., University of Pennsylvania; Additional study, St. Jude Children's Research Hospital.

Faith A. Zamamiri-Davis (2011). Assistant Professor of Biology. B.S., Westmont College; Ph.D., Pennsylvania State University; Additional study, St. Jude Children's Research Hospital.

Conservation Biology Majors may meet the requirements to become a Certified Wildlife Biologist by taking twelve hours of communication. The General Core requirement for COM 112 and electives of COM 121 and COM 235 may be used to fulfill 9 hours of this requirement. The remaining hours may be selected in consultation with your assigned faculty advisor.

I. Major in General Biology—42–45 hours

A. Independent Research Option

1. BIO 112, 210, 211, 215, 315, 318–24 hours
2. Four 300-level BIO courses—14 hours minimum
3. BIO 425, 426, 437, 498—4 hours

B. Collaborative Research Option

1. BIO 112, 210, 211, 215, 315, 318–24 hours
2. Four 300-level BIO courses—14 hours minimum
3. BIO 304, 415, 498—7 hours

II. Major in Zoology—43–47 hours

A. Independent Research Option

1. BIO 112, 200, 210, 211, 301, 312, 316, 336—32 hours
2. Select one from: BIO 304, 310, 315, 317, 323, 325—4 hours
3. Select one from: BIO 318, 321, 324, 356, 357, 360—3 or 4 hours
4. BIO 425, 426, 437, 498—4 hours

B. Collaborative Research Option

1. BIO 112, 200, 210, 211, 301, 312, 316, 336—32 hours
2. Select one from: BIO 310, 315, 317, 323, 325—4 hours
3. Select one from: BIO 318, 321, 324, 356, 357, 360—3 or 4 hours
4. BIO 304, 415, 498—7 hours

III. Major in Cell and Molecular Biology—72–76 hours

A. Independent Research Option

1. BIO 112, 211; 210 or 215—12 hours
2. BIO 315, 323, 325, 397—15 hours
3. Three of BIO 307, 309, 310, 316, 317, 320, 321, or 324—12 hours
4. One 300-level BIO Elective—3 or 4 hours
5. CHE 111, 112, 314, 315, 324, 326, 319, 329—26 hours
6. BIO 425, 426, 437, 498—4 hours
7. No minor is required

B. Collaborative Research Option

1. BIO 112, 211; 210, 215—12 hours
2. BIO 315, 323, 325, 397—15 hours
3. Three of BIO 307, 309, 310, 316, 317, 320, 321, or 324—12 hours
4. One 300-level BIO Elective—3 or 4 hours
5. CHE 111, 112, 314, 315, 324, 326, 319, 329—26 hours
6. BIO 304, 415, 498—7 hours
7. No minor is required

IV. Major in Conservation Biology—66–68 hours

A. Prerequisites or Corequisites: CHE 111; 2 MAT courses 111 or higher

- B. BIO 112, 200, 210, 215; PHY 112 or higher—20 hours
- C. BIO 303, 304, 305, 318, 335, 355—20 hours
- D. BIO 425, 426, 437, 498—4 hours
- E. Two of BIO 337, 358, 359, or 360—8 hours

Four of BIO 301, 312, 315, 316, 321, 324, 336, 356, 357—14–16 hours

F. No minor is required.

V. Major in Botany—43–47 hours

- A. Independent Research Option
1. Independent Research Option

Progression

- Maintain at least a 3.50 GPA both overall and in Biology
- Complete each honors contract course with a B or better

A one-time, one-semester probation will be allowed to correct a deficient GPA. If the deficiency is not corrected, the student

211. Microbiology (4) F, S

Prerequisite: BIO 112

Pre- or Corequisite: CHE 111

Classification, morphology, physiology, and ecology of bacteria and viruses, with special emphasis on bacteria. Three hours lecture and 3 hours laboratory/week.

215. Botany (4) F, S

Prerequisite: BIO 112.

Pre- or Corequisite: CHE 111.

Classification, morphology, physiology, and ecology of the algae, fungi, bryophytes, and vascular plants. Three hours lecture and 3 hours laboratory/week.

221. Human Anatomy and Physiology I (4) F, Su

The first semester of a 2-semester course for nursing, physical education, and allied health students. Body systems studied include the integumentary, nervous, skeletal, and muscular. Three hours lecture and 2 hours laboratory/week. No credit toward BIO major/minor.

222. Human Anatomy and Physiology II (4) S, Su

A continuation of BIO 221. Systems studied include: urinary, cardiovascular, lymphatic, endocrine, digestive, and respiratory. Three hours lecture and 2 hours laboratory/week. No credit toward a BIO major/minor.

300. Pathophysiology (3) F, W, S

Prerequisites: BIO 221 and 222.

Study of various states of altered health. Topics: stress, shock, altered acid-base balance, altered fluid and electrolyte balance, neoplasia, hypertension, immunodeficiency, genetic disorders, altered cardiac rhythms, renal failure and uremia. No credit toward a BIO major/minor.

301. Invertebrate Zoology (4) F–Even Years

318. Ecology (4) S

Prerequisite: BIO 112 and 8 hours applicable to the BIO major. A study of the interactions between organisms and their biological and physical environments. Three hours lecture and 3 hours laboratory/week.

320. Immunology (4) F

Prerequisites: BIO 112, 211, and 4 hours applicable to the BIO major; CHE 314/324 is recommended.

Structure and function of the immune system and some diseases related to the immune system. Laboratory will focus on a group research project. Three hours lecture and 3 hours laboratory/week.

321. Ecotoxicology (4) As Needed

Prerequisites: BIO 112, 8 hours applicable to the BIO major and CHE 111-2.

A comprehensive overview of the ecological consequences of environmental pollution, the effects of toxic substances on the ecosystem as a whole and on individuals within that ecosystem, and the methodology of assessing pollutant damage. Three hours lecture and 3 hours laboratory/week.

322. Human Gross Anatomy (3) S

Prerequisites: BIO 221 and 222 or 210.

Cadaver anatomy and dissection for nursing, preprofessional, and physical education students to enhance understanding of anatomy and prepare for work on living humans.

323. Cell Biology (4) S

Prerequisite: BIO 112 and 8 hours applicable to the BIO major.

A study of biological systems at the cellular and subcellular levels emphasizing functional aspects such as protein procession and sorting, membrane systems, energy generation in mitochondria and chloroplasts, and cell signaling. Three hours lecture and three hours laboratory/week.

324. Medical Parasitology (4) W—Even Years

Prerequisite: BIO 112 and 8 hours applicable to the BIO major.

Parasitology is a course that will apply information learned in a variety of Biology courses to the study of parasites and parasitic diseases. Specifically, this course will address the ecology, epidemiology and biochemistry of parasites and diseases caused by parasites. The laboratory will focus on the identification of important parasite groups and methods for host examination and diagnosis. Three hours of lecture and 3 hours laboratory/week.

325. Molecular Biology (4) F

Prerequisites: BIO 112, 211 and 4 hours applicable to the BIO major; CHE 314/324 is recommended.

Basic principles of molecular biology focusing on recombinant DNA methods as applied to a variety of biological questions. Students will learn basic research laboratory skills through a wide range of methods from gel electrophoresis to subcloning. Three hours lecture and three hours laboratory/week.

335. Conservation Biology (3) S—Even Years

Prerequisites: BIO 112, 200, and 4 hours applicable to the BIO major.

A study of the principles of conservation and wildlife management. Examines the ecology of species of interest and the habitat manipulation techniques used in the conservation of such organisms.

336. Ecology and Conservation of the Vertebrates (4) F—Even Years

Prerequisites: BIO 112, 210 and 4 hours applicable to the BIO

358. Plant Physiology (4) S-Even Years

Prerequisites: BIO 112, 215, 4 additional hours applicable to the BIO major, and CHE 111 (CHE 112 recommended).

Study of physiological factors influencing the chemical and structural composition of plant absorption and utilization of water and minerals; photosynthesis, translocation, respiration, nitrogen metabolism; and growth and development. Physiology is the study of how plants function, including resource acquisition, energy creation and use, resource allocation, life cycle, and stress response. Three hours lecture and three hours laboratory/week.

359. Dendrology (4) F-Even Years

Prerequisites: BIO 112, 215, and 4 additional hours applicable to the BIO major.

This course will focus on the identification and management of trees, focusing on forest ecology and silvicultural practices. The laboratory will include field trips that will focus on tree identification. Three hours lecture and three hours laboratory/week.

360. Plant-Insect Interactions (4) F-Odd Years

Prerequisites: BIO 112, 215 and 4 hours applicable to the BIO major. BIO 210 is strongly recommended.

This course is designed to introduce the student to insects and their relationships with plants. Lecture will cover insect ecology, taxonomy, and biology, as well as plant strategies to overcome insect damage and mutualism between plants and insects. The laboratory and field portions of the class will involve insect collection and identification, along with the evaluation of positive and negative impacts of insects on plants. Three hours lecture and 3 hours laboratory/week.

415. Collaborative Research Experience (2) S

Prerequisites: Junior standing, 20 hours applicable to the BIO major, minimum BIO GPA 2.0.

An introduction to the skills necessary to conduct scientific research in a group setting. Each group will develop a research question and submit research addressing that question. Students will attend all scheduled presentations. Course is not available by audit.

425. Introduction to Research (1) F, S

Prerequisites: Junior Standing, 20 hours applicable to the BIO major, minimum BIO GPA of 2.0.

An introduction to the skills necessary to conduct scientific research, prepare a manuscript and make a presentation at a scientific meeting. Each student will develop and submit a research proposal for approval. Students will attend all scheduled presentations. Course not available by audit.

426. Research Experience I (1) F, S, Su, W

Prerequisites: BIO 425 or 415, minimum BIO GPA of 2.0.

Individual research in accordance with the proposal developed

Restoration Ecology (4)

Ecological and theoretical foundations for ecosystem and biotic community restoration. This course develops ecological principles for ecosystem restoration and applies them to redeeming and restoring degraded and damaged ecosystems and endangered species. Field studies include analysis of restoration and rehabilitation work with the Kirtland Warbler, an officially designated wild river, coastal dunes, kettle-hole bogs, deforested lands, degraded residential and farming sites, and abandoned oil wells. A practical field laboratory is included in which techniques are applied to a specific site. Prerequisite: one year of biology and one course in ecology or field biology, or permission of professor.

179-279-379-479. External Domestic Study Programs (1-3)

As Needed

All courses and their applications must be defined and approved prior to registering.

179PF-279PF-379PF-479PF. External Domestic Study Programs (Pass/Fail) As Needed

All courses and their applications must be defined and approved prior to registering.

180-280-380-480. Study Abroad Programs (1-4)

All courses and their application must be defined and approved prior to travel.

180PF-280PF-380PF-480PF. Study Abroad Programs (Pass/Fail) As Needed

All courses and their applications must be defined and approved prior to travel.

195-6-7. Special Studies (1-4)

295-6-7. Special Studies (1-4)

Lower-level group studies that do not appear in the regular departmental offerings.

395-6. Special Studies (1-4)

Upper-level group studies that do not appear in the regular departmental offerings.

397. Special Studies in Cell and Molecular Biology (3) F or S

Upper-level group studies that do not appear in the regular departmental offerings.

495-6-7. Independent Study (1-4)

Individual research under the guidance of a faculty member(s).