

BIOLOGY LAB (BIOZ)

BIOZ 101. Biological Concepts Laboratory. 1 Hour.

Semester course; 2 laboratory hours. 1 credit. Concurrent prerequisite: BIOL 101, 151 or 152. Laboratory exercise correlated with BIOL 101. Not applicable for credit toward the B.S. in Biology.

BIOZ 151. Introduction to Biological Science Laboratory I. 1 Hour.

Semester course; 3 laboratory hours. 1 credit. Prerequisite: MATH 139, MATH 141, MATH 151, MATH 200, MATH 201 or a satisfactory score on the math placement exam; and CHEM 100 with a minimum grade of B, CHEM 101 with a minimum grade of C or a satisfactory score on the chemistry placement exam. Concurrent prerequisite: BIOL 151. Laboratory investigation of cellular metabolism, genetics and molecular biology, with an emphasis on formation and testing of hypotheses. Laboratory exercises will elaborate themes discussed in BIOL 151.

BIOZ 152. Introduction to Biological Science Laboratory II. 1 Hour.

Semester course; 3 laboratory hours. 1 credit. Prerequisites: BIOL 151, BIOZ 151 and CHEM 101, each with a minimum grade of C. Concurrent prerequisite: BIOL 152. Laboratory investigation of evolutionary concepts, evolution of organisms, biological diversity and ecology, with an emphasis on formation and testing of hypotheses. Laboratory exercises will elaborate themes discussed in BIOL 152.

BIOZ 201. Human Biology Laboratory. 1 Hour.

Semester course; 2 laboratory hours. 1 credit. Concurrent prerequisite: BIOL 201. Laboratory exercises correlated with BIOL 201 Human Biology. Exercises emphasize the structure, function and disorders of human body systems, principles of human genetics and inheritance, and human evolution and ecology. Not applicable for credit toward the B.S. in Biology.

BIOZ 209. Medical Microbiology Laboratory. 1 Hour.

Semester course; 2 laboratory hours. 1 credit. Concurrent prerequisite: BIOL 209. Techniques to culture, isolate and identify microbes with related topics such as water coliform tests, and antibiotics and disinfectant sensitivity testing. Not applicable for credit toward the B.S. in Biology.

BIOZ 303. Microbiology Laboratory. 2 Hours.

Semester course; 1 recitation and 3 laboratory hours. 2 credits. Concurrent prerequisite: BIOL 303. Laboratory application of techniques and concepts in microbiology. Emphasis is placed on techniques to isolate, culture and identify bacteria; genetics and molecular biology of bacteria; safety and aseptic protocols; assays for antibiotic and disinfectant susceptibility.

BIOZ 307. Aquatic Ecology Laboratory. 1 Hour.

Semester course; 3 laboratory hours. 1 credit. Prerequisites: BIOL 317, CHEM 102 and CHEZ 102, with minimum grades of C. Concurrent prerequisite: BIOL 307. Laboratory and field studies of the biota of aquatic habitats and their relationship with the environment.

BIOZ 310. Laboratory in Genetics. 2 Hours.

Semester course; 1 lecture and 3 laboratory hours. 2 credits. Prerequisites: UNIV 200 or HONR 200; and BIOL 152 and BIOZ 152, each with a minimum grade of C. Concurrent prerequisite: BIOL 310. Demonstrates the laws and molecular basis of heredity through exercises and experiments that use a variety of organisms.

BIOZ 312. Invertebrate Zoology Laboratory. 1 Hour.

Semester course; 3 laboratory hours. 1 credit. Prerequisites: BIOL and BIOZ 151 and 152, with minimum grades of C. Concurrent prerequisite: BIOL 312. A field and laboratory survey of the invertebrate animals, with emphasis on identification and natural history.

BIOZ 313. Vertebrate Natural History Laboratory. 1 Hour.

Semester course; 3 laboratory hours. 1 credit. Prerequisites: BIOL and BIOZ 151 and 152, with minimum grades of C. Concurrent prerequisite: BIOL 313. Laboratory exercises focusing on the natural history of vertebrates, with emphasis on the species native to Virginia.

BIOZ 317. Ecology Laboratory. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Prerequisites: BIOL 151 and BIOZ 151; BIOL 152 and BIOZ 152; and UNIV 200 or HONR 200; all with minimum grades of C. Concurrent prerequisite: BIOL 317. A field-oriented course that provides experience in ecological research, including experimental design, instrumentation, data collection and data analysis.

BIOZ 321. Plant Development Laboratory. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Concurrent prerequisite: BIOL 321. An experimental approach applied to a phylogenetic survey of developmental model systems. Observational and experimental protocols will be used to collect data and gather information. Problem-solving skills will be utilized to analyze and present experimental results.

BIOZ 324. Medicinal Botany Laboratory. 1 Hour.

Semester course; 3 laboratory hours. 1 credit. Prerequisites BIOL 151 and BIOZ 151; BIOL 152 and BIOZ 152; and BIOL 300, all with a minimum grade of C. Concurrent prerequisite: BIOL 324. Introduces basic plant biology concepts, plant diversity and systematics, and various medicinal plant species, compounds and properties.

BIOZ 367. Explorations in Cellular Organization. 3 Hours.

Semester course; 2 recitation hours and 3 laboratory hours. 3 credits. Prerequisites: BIOL 200 and BIOL 300, each with minimum grades of C; completion of BIOL 310 is strongly recommended. Eukaryotic cells compartmentalize biological processes into discrete organelles, and this organization is critically important for cell function in health and disease. This course-based research experience provides a theoretical and practical overview of the design and execution of experimental workflows in biology, as well as generation and testing of hypotheses. During lab sessions, students will conduct a series of progressive experiments to explore an unanswered question related to eukaryotic cell organization, analyze and interpret data, and reflect on the meaning of their discoveries. Recitation will cover theoretical aspects of the research question and experimental design, as well as relevant tools, techniques and literature needed for lab sessions.

BIOZ 391. Topics in Biology Laboratory. 1-4 Hours.

Semester course; 1-4 laboratory hours. 1-2 credits. Prerequisite: BIOL 300, BIOL 310, BIOL 317 or BIOL 318, with a minimum grade of C. Laboratory investigations in a selected topic of biology. See the Schedule of Classes for specific topics to be offered each semester and prerequisites.

BIOZ 395. Directed Study Laboratory. 1-2 Hours.

Semester course; 3-6 Independent study hours. 1-2 credits. May be repeated for a maximum of two credits. Prerequisites: BIOZ 151 and BIOZ 152, each with a minimum grade of C. Enrollment is restricted by permission of the Department of Biology and faculty mentor. A maximum of two credits may be earned between BIOL 395 and BIOZ 395; a maximum total of six credits for all research and internship courses (BIOL 395, BIOL 451, BIOL 453, BIOL 492, BIOL 493, BIOL 494, BIOL 495, BIOZ 395 and/or BIOZ 493) may be applied to the 40 credits of Biology required for the major. Additional credits from the courses may be applied to upper-level and open elective credits toward the degree. The nature of the project is defined through an agreement between the student and the mentor and must involve hands-on learning with a focus on data handling and interpretation. May include directed readings, experimental work or advanced guided inquiry, all under the faculty member's supervision. Students will develop a final deliverable showcasing their project's scope and outcomes, with the form and content varying according to the project's focus. A minimum of three hours of supervised activity per week per credit hour is required. Graded as pass/fail.

BIOZ 399. Experiential and Applied Topics: _____. 4 Hours.

Semester course; 0-4 lecture hours. 0-4 credits. Prerequisites: BIOZ 151 and BIOZ 152 with minimum grades of C. Enrollment requires permission of the Department of Biology. Completion of an experiential learning activity or project as approved by the Department of Biology. Experiences vary by section; may include study abroad, study away, course-based undergraduate research, funding-dependent opportunities or other transient course offerings. Provides the student with an opportunity to engage in meaningful hands-on research, scholarship or creative work directly relevant to realizing their personal and professional goals. See the Schedule of Classes for specific topics to be offered each semester and prerequisites.

BIOZ 401. Applied and Environmental Microbiology Laboratory. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Prerequisite: BIOL 303, BIOL 401 or permission of instructor. Offers students the opportunity to gain skills and experience necessary to perform a variety of microbiology analyses including both cultivation-based approaches and cultivation-independent methods. Students will apply these techniques and concepts to conduct experiments in soil and aquatic ecology, drinking water quality, wastewater treatment, food production and other environmental applications.

BIOZ 405. Gross Anatomy Laboratory. 2 Hours.

Semester course; 1 recitation and 3 lab hours. 2 credits. Prerequisite: BIOL 205 or BIOL 402 with a minimum grade of B. Enrollment requires permission of the instructor. Lab-based advanced human anatomy course utilizing regional-based cadaver dissection to focus on integrative functions of anatomical structures. Anatomical anomalies, clinical application and relevant advances are applied in the context of exploratory learning and emergent topics. Enrollment is intended for pre-health and biology majors.

BIOZ 416. Ornithology Laboratory. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Prerequisite: BIOL 317 with a minimum grade of C. Concurrent prerequisite: BIOL 416. A field-oriented course that develops basic skills in bird identification by sight and sound for a variety of regional taxa with emphasis on avian anatomy and adaptations for flight. Students conduct an independent or small-group research project on a question of their choice relating to avian ecology or behavior, including experimental design, data collection and analysis, and a final project presentation.

BIOZ 418. Integrative Physiology Laboratory. 3 Hours.

Semester course; 2 recitation and 3 laboratory hours. 3 credits. Prerequisites: BIOL 151 and BIOZ 151; BIOL 152 and BIOZ 152; BIOL 300 and BIOL 317; or equivalents, all with minimum grades of C. A comparative laboratory investigation of physiological responses across plant and animal taxa, with application to changing environmental conditions and ecological interactions. Topics include metabolism, water balance, gas exchange, resource allocation and chemical signaling.

BIOZ 438. Forensic Molecular Biology Laboratory. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Concurrent prerequisite: BIOL/FRSC 438. Provides comprehensive coverage of the various types of DNA testing currently used in forensic science laboratories. Students will have hands-on experience with the analytical equipment employed in forensic science laboratories and the techniques for human identification in forensic casework. Students also will explore and practice both scientific writing and writing of DNA case reports. Crosslisted as: FRSZ 438.

BIOZ 476. Molecular Biology Laboratory. 2 Hours.

Semester course; 3 laboratory hours. 2 credits. Prerequisites: BIOL 300 and BIOL 310, each with a minimum grade of C. Hands on experience with molecular biology laboratory techniques. Experiments can change from semester to semester, but can include ELISA, PCR and sterile mammalian cell culture. Concentration placed on experimental execution, including the function of laboratory reagents, materials and equipment. Emphasis on reading the primary, peer-reviewed literature, scientific communication and ethics.

BIOZ 491. Topics in Biology Laboratory. 1-4 Hours.

Semester course; variable hours. Variable credit. Prerequisites: BIOL 300 with a minimum grade of C. Laboratory investigations in a selected topic of biology. See the Schedule of Classes for specific topics to be offered each semester and prerequisites.

BIOZ 493. Biology Internship Laboratory. 4 Hours.

Semester course; 0-4 field experience hours. 0-4 credits (one credit per 50 hours of supervised work experience). May be repeated for a maximum of 18 credits. Prerequisites: BIOL 151, BIOZ 151, BIOL 152 and BIOZ 152, each with minimum grade of C. Enrollment is restricted by permission of the Department of Biology and institution where the internship will be performed. Students may take a maximum of four credits per semester; maximum total of six credits for all research and internship courses (BIOL 395, BIOL 451, BIOL 453, BIOL 492, BIOL 493, BIOL 494, BIOL 495, BIOZ 395 and/or BIOZ 493) may be applied to the 40 credits of biology required for the major. Additional credits from the courses may be applied to upper-level and open elective credits toward the degree. Internship is designed to provide laboratory, field or work experience in a professional biology setting. To justify registration for this BIOZ laboratory experience credit, the internship must involve hands-on data collection and analysis as approved by the department. In addition to an internship proposal and professional practices/reflection assignments, a final report/reflection must be submitted during the course of the internship.