

# BIOLOGY (BIOL)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes ([https://csprd.louisville.edu/psp/ps\\_class/EMPLOYEE/PSFT\\_CS/c/COMMUNITY\\_ACCESS.CLASS\\_SEARCH./x/?state=62dab551a0d600a5e8237359c50704e59007&duo\\_code=sjUx20STj21](https://csprd.louisville.edu/psp/ps_class/EMPLOYEE/PSFT_CS/c/COMMUNITY_ACCESS.CLASS_SEARCH./x/?state=62dab551a0d600a5e8237359c50704e59007&duo_code=sjUx20STj21))

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

## Course Fees

Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (<https://louisville.edu/bursar/tuitionfee/university-fees/>).

### BIOL 102. Biology: Current Issues and Applications - S 3 Units

**Term Typically Offered:** Fall, Spring, Summer

**Description:** Selected topics from the biological sciences that focus on high-profile issues in biological sciences and their socio-scientific applications.

**Note:** May fulfill general education natural science requirement but does not count toward biology major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

### BIOL 104. Laboratory for Biology: Current Issues and Applications - SL 1 Unit

**Term Typically Offered:** Fall, Spring, Summer

**Prerequisite(s):** Completion of or concurrent enrollment in BIOL 102.

**Fee:** An additional \$15.00 is charged for this course.

**Description:** Hands-on laboratory experience for students not majoring in the sciences. Labs are designed to develop skills in scientific methodology, observation and critical thinking.

**Note:** Does not count toward biology major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

### BIOL 203. Scientific Information Literacy and Communication - OC 3 Units

**Term Typically Offered:** Spring Only

**Description:** To improve oral communication skills that transfer across disciplines; to fulfill a general education oral communication requirement with a course that has science-intensive content; to improve student skills in critically assessing scientific claims; and to introduce students early in their programs to work of potential research mentors.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

### BIOL 240. Unity of Life - S 3 Units

**Term Typically Offered:** Fall, Spring, Summer

**Prerequisite(s):** To enroll, students must meet one of the following: ACT score of 24+ on science, math, or composite scores; SAT math score of 540+; Accuplacer QRAS score of 250 or higher; high school GPA of 3.5 or above (on a 4-point scale); or completion of BIOL 102 (or department-approved equivalent) with a passing grade.

**Description:** Basic biological principles; macromolecules, biology of cells, metabolism, genetics, and evolution.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

### BIOL 241. Experimental Biology I: Molecules and Cells - SL 1 Unit

**Term Typically Offered:** Fall, Spring, Summer

**Prerequisite(s):** Successful completion of or concurrent enrollment in BIOL 240.

**Fee:** An additional \$40.00 is charged for this course.

**Description:** This is a laboratory course that complements BIOL 240 Unity of Life. In this class, you will learn the basic principles of scientific inquiry and practice techniques biologists use to study cells and molecules. This will include learning about experimental design, hypothesis testing, and statistics, as well as using microscopes, chromatography, and genomic tools.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

### BIOL 242. Diversity of Life - S 3 Units

**Term Typically Offered:** Fall, Spring, Summer

**Prerequisite(s):** To enroll, students must meet one of the following: ACT score of 24+ on science, math, or composite scores; SAT math score of 540+; Accuplacer QRAS score of 250 or higher; high school GPA of 3.5 or above (on a 4-point scale); completion of BIOL 102 (or department-approved equivalent) with a passing grade.

**Description:** Completion of 240 with a C or better is highly recommended. Taxonomy and classification, form and function of monerans, fungi, protists, plants and animals; survey of ecology.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

### BIOL 243. Experimental Biology II: Organismal Biology - SL 1 Unit

**Term Typically Offered:** Fall, Spring, Summer

**Prerequisite(s):** BIOL 241; and concurrent enrollment in, or previous completion of, BIOL 242.

**Fee:** An additional \$40.00 is charged for this course.

**Description:** A comprehensive laboratory in biology involving experiments covering phylogeny, diversity, systems, and ecology. An emphasis is placed on critical analysis of scientific data through application of the scientific method and experimental design. This is a laboratory course that complements the BIOL 242 Diversity of Life lecture course.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

|  |  |
|--|--|
| <p><b>BIOL 257. Introduction to Microbiology - S</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Prerequisite(s):</b> BIOL 102 or BIOL 240, or equivalents; and CHEM 105 or CHEM 201 (CHEM 101 accepted for Dental Hygiene students only).<br/> <b>Description:</b> Survey of microorganisms including structure-function relationships, growth and its control, metabolism and genetics. Diversity will be discussed with emphasis on infectious diseases, epidemiology, and basic immunology.<br/> <b>Note:</b> Does not count towards biology major or minor.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   | <p><b>BIOL 262. Human Anatomy &amp; Physiology Lab</b> <span style="float: right;"><b>1 Unit</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Prerequisite(s):</b> Completion of BIOL 260 with a grade of C or better and concurrent enrollment in BIOL 261.<br/> <b>Fee:</b> An additional \$25.00 is charged for this course.<br/> <b>Description:</b> A study and correlation between the anatomy and physiology of selected organ systems.<br/> <b>Note:</b> Does not count towards biology major or minor.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  |
| <p><b>BIOL 258. Introduction to Microbiology Laboratory - SL</b> <span style="float: right;"><b>1 Unit</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Prerequisite(s):</b> Completion of or concurrent enrollment in BIOL 257.<br/> <b>Fee:</b> An additional \$25.00 is charged for this course.<br/> <b>Description:</b> The introductory microbiology laboratory teaches students basic microbiological techniques that are necessary to study and safely handle microorganisms and their viruses. Because this course relies on participation, attendance will be included in the evaluation.<br/> <b>Note:</b> Does not count toward biology major or minor.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 263. Environmental Biology - B</b> <span style="float: right;"><b>4 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Fee:</b> An additional \$15.00 is charged for this course.<br/> <b>Description:</b> A study of the biological principles of environmental effects on living organisms; emphasis on ecological relationships of humans, including resource exploitation, pollution, environmental degradation, and human behavior. Includes laboratory and field components.<br/> <b>Note:</b> Does not count toward biology major or minor.<br/> <b>Note:</b> Students who have already received credit for BIOL 363 may not receive credit for this course.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   |
| <p><b>BIOL 260. Human Anatomy &amp; Physiology I</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Prerequisite(s):</b> BIOL 102 or BIOL 240 or equivalent with a grade of C or better; and completion of CHEM 101 or CHEM 105 or CHEM 201 with a grade of C or better.<br/> <b>Description:</b> A general introduction to structure and function of the human body. Basic concepts related to anatomical terminology, cells, tissues, and integumentary, the skeletal, muscular, nervous, and endocrine systems are covered. Interrelationships of organ systems are also emphasized.<br/> <b>Note:</b> This course is intended for students majoring in nursing or dental hygiene.<br/> <b>Note:</b> Does not count toward a biology major or minor.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> | <p><b>BIOL 264. Human Anatomy and Physiology I Laboratory</b> <span style="float: right;"><b>1 Unit</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Fee:</b> An additional \$68.00 is charged for this course.<br/> <b>Description:</b> Prerequisites or corequisites: Either concurrent enrollment in BIOL 260 or completion of BIOL 260 with a C or better In this lab you will learn to identify human tissues and organs, with an emphasis on integumentary, skeletal, muscular, nervous, and endocrine systems. You will study the physiological functions of some of these structures through experimentation on each other. Along the way you will be introduced to collection and presentation of scientific data. We will emphasize the connection between structure and function, usually in the healthy individual but with some exploration of abnormalities found in disease states. Note: Does not count for the Biology major or minor<br/> For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>                       |
| <p><b>BIOL 261. Human Anatomy &amp; Physiology II</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Prerequisite(s):</b> BIOL 260 with a grade of C or better.<br/> <b>Description:</b> A general introduction to structure and function of the human body. Concepts related to the cardiovascular, immune and lymphoid, respiratory, digestive, urinary and reproductive systems are covered. Interrelationships of organ systems are also emphasized.<br/> <b>Note:</b> Does not count toward biology major or minor.<br/> <b>Note:</b> Does not count toward biology major or minor.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 265. Human Anatomy and Physiology II Laboratory</b> <span style="float: right;"><b>1 Unit</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring, Summer<br/> <b>Prerequisite(s):</b> BIOL 260 with a C or better and BIOL 264 with C or better.<br/> <b>Fee:</b> An additional \$68.00 is charged for this course.<br/> <b>Description:</b> Prerequisites or corequisites: BIOL 261 with a grade of C or better. In this lab you will learn to identify human tissues and organs, with an emphasis on the cardiovascular, immune and lymphoid, respiratory, digestive, urinary, and reproductive systems. You will study the physiological functions of some of these structures through experimentation on each other. Along the way you will be introduced to collection and presentation of scientific data. We will emphasize the connection between structure and function, usually in the healthy individual but with some exploration of abnormalities found in disease states.<br/> For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> |

- BIOL 300. Plant Biology - WR** **3 Units**  
**Term Typically Offered:** Fall Only  
**Prerequisite(s):** BIOL 240 and BIOL 242.  
**Description:** This course examines the biology of plants and other organisms with cell walls (including bacteria, fungi, protists, and algae). These distantly related organisms include primary producers that energize the biosphere, decomposers that recycle nutrients and economic species that provide most of humanity's food, fiber and medicine. As part of the course content, students compose an original manuscript based on in-class experiments. This manuscript includes a literature review. Students submit this manuscript as a draft, receive comments, and then revise their final version based on those comments. For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 304. Plant Taxonomy & Ecology - WR** **3 Units**  
**Term Typically Offered:** Occasionally Offered  
**Prerequisite(s):** BIOL 240, BIOL 241, BIOL 242, BIOL 243.  
**Description:** Introduction to the principles and methods of identifying, naming, and classifying plants. Focus on ecologically significant plants of North America and Kentucky, and discussion of the importance of specific species in maintaining ecosystem structure and function.  
**Note:** Approved for the Arts and Sciences upper-level requirement in written communication (WR).  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 308. Vertebrate Zoology** **3 Units**  
**Term Typically Offered:** Fall Only  
**Prerequisite(s):** BIOL 240, BIOL 241, BIOL 242, and BIOL 243.  
**Description:** Explores the anatomy, ecology, and behavior of vertebrates from an evolutionary perspective. Laboratory work centers on anatomy and includes species identification, data collection, analysis, and presentation activities.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 310. Animal Behavior** **3 Units**  
**Term Typically Offered:** Fall Only  
**Prerequisite(s):** BIOL 240, BIOL 241, BIOL 242 and BIOL 243.  
**Description:** Survey of the field of animal behavior. Topics include communication, learning, mate choice, fighting and aggression, and mating systems.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 313. Scientific Publishing - WR** **3 Units**  
**Term Typically Offered:** Spring Only  
**Description:** This class is for The Cardinal Edge (TCE) staff, the University of Louisville's undergraduate research journal, and other students who desire to learn about the academic publishing process. Key aspects of the journal's production include design, outreach, review, and spotlight writing. Approved for the Arts and Sciences upper-level requirement in written communication (WR).  
**Note:** Formerly offered as BIOL 390-50.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 321. Introduction to Health Professions Skills Laboratory - SL** **1 Unit**  
**Term Typically Offered:** Fall, Spring  
**Prerequisite(s):** BIOL 102 or BIOL 240 or equivalent, and CHEM 101 or CHEM 105 or CHEM 201 or equivalent.  
**Fee:** An additional \$50.00 is charged for this course.  
**Description:** This introductory laboratory course teaches students basic clinical skills and techniques that are necessary to work safely in a variety of clinical settings. This class will provide an introduction and background familiarity with various things you will need to know to be successful in the BIOL 322 and 323 internship courses. Because this course introduces you to a wide variety of clinical settings and skills, you will not be an expert in any one skill upon leaving this course. Rather, you will gain experience with multiple skills appropriate to the healthcare workforce. Because this course relies on participation, attendance will be included in the evaluation.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 322. Healthcare Workforce Internship I** **3 Units**  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** PHP 250 and BIOL 321 OR instructor permission This internship class will provide you with professional experiences that can be critical to obtaining employment in your field.  
**Description:** You will discover how what you've learned in the classroom can be applied in a more practical setting, you can make contacts that will be useful for references in the future, and you will be able to examine your career plans and determine whether they need adjustment or are confirmed by your experiences.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 323. Healthcare Workforce Internship II** **3 Units**  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** BIOL 322 and instructor permission Your internship in Clinical Lab Skills II will build on the skills and professional experiences that you gained in Clinical Lab Skills I.  
**Description:** You will be discovering more about how the knowledge you've learned in the classroom can be applied in a more practical setting, you will examine and hone your career goals, and you can make contacts that will be useful for references in the future. Because developing your career plans is an important part of the Clinical Lab Skills courses, you have two distinct options for this course: If your chosen site for the Clinical Lab Skills I course confirmed your interest in that particular area of health care and you would prefer to gain further experience in that area, you can continue working in that field in this course. However, if your experiences confirmed your interest in working in health care but you work prefer to explore a different field, you can work at a different site and in a different field in this course.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)
- BIOL 329. Cellular and Molecular Biology** **3 Units**  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** BIOL 240, BIOL 242, and CHEM 201.  
**Description:** Processes at the molecular and cellular levels integrated with the science of biology and biodiversity.  
For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

|   |   |
|---|---|
| <p><b>BIOL 330. Genetics and Molecular Biology</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> BIOL 329.<br/> <b>Description:</b> Genetics presented from a Mendelian to a molecular point of view.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 361. MICROBIOME ECOLOGY - WR</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 241, BIOL 242, and BIOL 243 In this three-credit-hour course, we will focus on the ecological principles that govern microbiomes across various ecosystems.<br/> <b>Description:</b> We will look at the roles that microbiomes play in supporting human, non-human, and ecosystem health and how microbial diversity, interactions, and community structure underlie those outcomes. This course is approved for the Arts and Sciences upper-level requirement in written communication (WR).<br/> <b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br/><br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> |
| <p><b>BIOL 331. Genetics and Molecular Biology: Laboratory</b> <span style="float: right;"><b>2 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> BIOL 330 (or concurrent).<br/> <b>Fee:</b> An additional \$25.00 is charged for this course.<br/> <b>Description:</b> The laboratory portion of BIOL 330 with exercises in genetics, cellular, and molecular biology.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   | <p><b>BIOL 363. Principles of Ecology</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 241, BIOL 242, and BIOL 243.<br/> <b>Description:</b> A majors' core course providing an overview of the basic principles and concepts of Ecology and an understanding of how those principles and concepts can aid in identifying and seeking solutions for human environmental problems.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  |
| <p><b>BIOL 347. Comparative Vertebrate Anatomy</b> <span style="float: right;"><b>4 Units</b></span><br/> <b>Term Typically Offered:</b> Spring Only<br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 242.<br/> <b>Fee:</b> An additional \$40.00 is charged for this course.<br/> <b>Description:</b> Phylogeny and comparative morphology of classes of vertebrates; structure and organ systems of lamprey, shark, and cat.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 372. Evolutionary Ecology of Disease</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall Only<br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 242, or consent of instructor.<br/> <b>Description:</b> An overview of genetic, parasitic, and environmental causes of disease; topics include evolution of virulence and antibiotic resistance, emerging diseases, and options for controlling disease.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   |
| <p><b>BIOL 350. Biostatistics</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> MATH 180 or MATH 205.<br/> <b>Description:</b> A survey course of statistical procedures commonly used in the life sciences. It is taught at an introductory level and will focus on the application of statistical procedures to data.<br/> <b>Note:</b> This lecture course is supplemented with a separate recitation section.<br/><br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> | <p><b>BIOL 376. Parasitology</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Spring Only<br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 241, BIOL 242 and BIOL 243.<br/> <b>Description:</b> A study of selected protozoan and helminth parasites with emphasis on host-parasite dynamics, methods of identification, life cycles, transmission, pathology, and treatment.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  |
| <p><b>BIOL 359. Microbial Genetics and Pathogenesis - WR</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Spring Only<br/> <b>Description:</b> A literature-based introduction to current microbial genetics and pathogenesis. Completion of BIOL 330 and BIOL 457 recommended prior to taking this course.<br/> <b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br/><br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>                                    | <p><b>BIOL 382. Entomology</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall Odd Years<br/> <b>Prerequisite(s):</b> BIOL 363.<br/> <b>Fee:</b> An additional \$25.00 is charged for this course.<br/> <b>Description:</b> Examination of the morphology, physiology, behavior, evolution and ecology of the major groups of insects. A collection of common insect families is required. The laboratory will include observations on live and preserved animals and possible field trips. Students will learn to: 1) use terms and concepts that describe the diversity of insects, 2) compare and contrast major insect groups with respect to structure and function, and 3) collect and prepare museum-quality specimens for scientific study.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>             |



|  |   |
|--|---|
| <p><b>BIOL 388. Research Opportunities in Biology</b> <span style="float: right;"><b>1 Unit</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> Permission of instructor and completion of BIOL 240 and BIOL 242 with a minimum grade of B.<br/> <b>Description:</b> A 1-credit seminar course to introduce sophomores to undergraduate research opportunities at UofL with the purpose of finding a laboratory in which to do an honors thesis project by junior year. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   | <p><b>BIOL 395. Pharmacology and Toxicology</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall Only<br/> <b>Prerequisite(s):</b> BIOL 330 This course will cover introduction to pharmacology including pharmacokinetics and dose calculations as well as major pathways of action of key pharmaceuticals used to treat depression and mood disorders, cardiovascular system drugs, and diabetes. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   |
| <p><b>BIOL 389. Undergraduate Seminar</b> <span style="float: right;"><b>1 Unit</b></span><br/> <b>Grading Basis:</b> Pass/Fail<br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Description:</b> Undergraduate seminar in varied aspects of biology; subject to be announced in the schedule of courses.<br/> <b>Note:</b> No more than 2 hours of BIOL 389 may be counted toward the major in biology.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 396. Preview to Dentistry -WR - WR</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Spring Only<br/> <b>Prerequisite(s):</b> BIOL 329 and BIOL 330 or equivalent, and consent of instructor.<br/> <b>Description:</b> This course is designed for pre-dental students and students considering dentistry as a career. The purpose of the course is to expose pre-dental students to the art, science, and practice of dentistry.<br/> <b>Course Attribute(s):</b> CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> |
| <p><b>BIOL 390. Special Topics</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Fall, Spring<br/> <b>Prerequisite(s):</b> BIOL 240 OR BIOL 242 with a C or better grade OR permission from the instructor.<br/> <b>Description:</b> Special topics in biology.<br/> <b>Course Attribute(s):</b> CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   | <p><b>BIOL 400. Histology</b> <span style="float: right;"><b>4 Units</b></span><br/> <b>Term Typically Offered:</b> Fall Only<br/> <b>Prerequisite(s):</b> BIOL 329 or consent of instructor.<br/> <b>Fee:</b> An additional \$25.00 is charged for this course.<br/> <b>Description:</b> The microscopic anatomy and function of vertebrate tissues and organs. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  |
| <p><b>BIOL 391. Special Topics in Biology - WR</b> <span style="float: right;"><b>1-4 Units</b></span><br/> <b>Term Typically Offered:</b> Occasionally Offered<br/> <b>Description:</b> Topics to be indicated in the Schedule of Courses.<br/> <b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br/> <b>Course Attribute(s):</b> CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> | <p><b>BIOL 401. Advanced Ecology</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Term Typically Offered:</b> Occasionally Offered<br/> <b>Prerequisite(s):</b> BIOL 363.<br/> <b>Description:</b> Major concepts in evolutionary ecology. Theoretical and experimental studies of adaptation, population growth and regulation, competition, predation, diversity, life histories, and ecosystems. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  |
| <p><b>BIOL 392. Microbes and Core Concepts in Ecology and Evolution - WR</b> <span style="float: right;"><b>3 Units</b></span><br/> <b>Prerequisite(s):</b> BIOL 357, BIOL 363, or BIOL 409.<br/> <b>Description:</b> Core concepts in ecology and evolution using microbes as primary examples. Students will read primary scientific literature and write scientific reviews of the literature in order to enhance their understanding of these concepts.<br/> <b>Note:</b> Approved for the Arts and Sciences upper-level requirement for written communication (WR).</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>                                      | <p><b>BIOL 402. Advanced Ecology Lab</b> <span style="float: right;"><b>2 Units</b></span><br/> <b>Term Typically Offered:</b> Occasionally Offered<br/> <b>Prerequisite(s):</b> BIOL 401 (or concurrently).<br/> <b>Fee:</b> An additional \$40.00 is charged for this course.<br/> <b>Description:</b> Field and laboratory experiments to investigate ecological principles. Discussion of research and practice of basic biostatistics and experimental design.<br/> <b>Course Attribute(s):</b> CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>                  |

**BIOL 404. Undergraduate Research 1-3 Units****Term Typically Offered:** Fall, Spring, Summer**Prerequisite(s):** Faculty and chair consent; minimum 30 credit hours; 3.0 cumulative GPA.**Description:** Undergraduate Research in a select subject area with a student-selected faculty member.**Note:** No more than 6 hours of Undergraduate Research (BIOL 404, BIOL 405 or BIOL 406 WR) or Independent Study (BIOL 501, BIOL 502 or BIOL 504 WR) may be used to meet the minimum in Biology for the BA or BS.**Course Attribute(s):** CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 405. Undergraduate Research - CUE 1-3 Units****Term Typically Offered:** Fall, Spring, Summer**Prerequisite(s):** Faculty and chair consent.**Description:** Undergraduate Research in a select subject area with a student-selected faculty member.**Note:** No more than 6 hours of Undergraduate Research (BIOL 404, BIOL 405 or BIOL 406 WR) or Independent Study (BIOL 501, BIOL 502 or BIOL 504 WR) may be used to meet the minimum in Biology for the BA or BS.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 406. Undergraduate Research (WR) - WR, CUE 1-3 Units****Term Typically Offered:** Fall, Spring, Summer**Prerequisite(s):** Faculty and chair consent; minimum cumulative grade point average of 3.0 and completion of biology core.**Description:** Undergraduate Research in a select subject area with a student-selected faculty member.**Note:** Approved for the Arts and Sciences upper-level requirement in written communication (WR).**Note:** No more than 6 hours of Undergraduate Research (BIOL 404, BIOL 405 or BIOL 406 WR) or Independent Study (BIOL 501, BIOL 502 or BIOL 504 WR) may be used to meet the minimum in Biology for the BA or BS.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 409. Evolutionary Biology - CUE 3 Units****Term Typically Offered:** Fall, Spring, Summer**Prerequisite(s):** BIOL 240 and BIOL 242; BIOL 244; or both BIOL 241 and BIOL 243 A review of basic evolutionary principles and processes including speciation, natural selection, sexual selection, extinction, heritability, genetic drift, inbreeding, outbreeding, heterochrony and Darwinian medicine.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 410. Misuse of Biology in Film and Pop Culture 3 Units****Term Typically Offered:** Occasionally Offered**Prerequisite(s):** BIOL 329, BIOL 330, and CHEM 341.**Description:** This course will examine how biology and themes in the biological sciences are portrayed in films and popular culture with a mind towards evaluating whether the science is appropriate or being misused. In the process of these analyses, we will explore such questions as: What is science and what is not? Also what is pseudo-science or bad science?

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 415. Biology of the Cell - CUE, WR 3 Units****Term Typically Offered:** Spring Only**Prerequisite(s):** BIOL 329 and BIOL 330.**Description:** Cellular, molecular, and biochemical aspects of cellular function.**Note:** Approved for the Arts and Sciences upper-level requirement in written communication (WR).**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 416. Biotechnology Methods - WR 4 Units****Term Typically Offered:** Occasionally Offered**Prerequisite(s):** BIOL 330, BIOL 331, and CHEM 344; and consent of instructor.**Fee:** An additional \$40.00 is charged for this course.**Description:** Designed for Biology and Chemistry students concentrating in Genetics/Subcellular. Provides hands-on experience with basic methods used in molecular biology, including but not limited to, agarose and polyacrylamide gel electrophoresis of nucleic acids and proteins, restriction digestion of DNA, Southern and Northern hybridization, PCR, DNA sequencing, and transformation of various cell types (including bacteria, fungi, plants, insects and vertebrates).**Note:** Approved for the Arts and Sciences upper-level requirement in written communication (WR).

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 425. Biology Seminar in Special Topics - WR, CUE** 2 Units**Term Typically Offered:** Fall, Spring**Prerequisite(s):** BIOL 330 with a C or better Discussion of relevant research, scientific papers, and current events in biology and related natural science disciplines.**Description:** Relevance and significance of the understanding of the natural principles in proper context and handling of personal and societal issues are a major focus of the discussions. This course is designed for upper division Biology majors to learn about areas of biology not currently covered elsewhere in the Biology curriculum. This course is primarily journal-article-based and will require either oral presentations and/or written components.**Note:** Students must have 90 credit hours completed prior to enrollment in this course.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)**BIOL 430. Undergraduate Teaching Assistant - CUE** 3 Units**Term Typically Offered:** Fall, Spring**Prerequisite(s):** BIOL 240, BIOL 242, BIOL 244, BIOL 329, BIOL 330 and BIOL 331; CHEM 341; minimum Junior standing; Biology major; 3.25 GPA in major; permission of instructor.**Description:** A guided learning experience in inquiry-based instructional techniques and best practices in STEM education that includes a field experience as an undergraduate teaching assistant. 2.5 GPA in major to be eligible.**Note:** Majors only, permission to enroll required, minimum cumulative 3.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)**BIOL 435. Chemical Ecology - WR** 3 Units**Term Typically Offered:** Spring Only**Prerequisite(s):** BIOL 240, BIOL 242, and CHEM 201.**Description:** This course will explore the remarkable world of chemical ecology. Where ecological outcomes between or among individuals are influenced or determined directly or indirectly by chemicals produced by individuals. A key focus will be the chemical ecology of plants. Though we will also explore chemical ecology in animals as well. Considerable ecological information is derived from chemicals produced by organisms both to other members of the same species or to a different species, and affect both natural and sexual selection. We will use an interactive discussion/seminar-style to interrogate the primary literature for current knowledge of how chemical cues influence a diverse array of ecological interactions. From the African savannas to galling insects in our own backyard. Students will have flexibility to choose their own research topics to pursue focused critical thinking and hypothesis generation. Discussions will span a range of disciplines including genetics, molecular biology, biochemistry, natural products, ecology, and evolution. As such, this course is intended for students who have some prior knowledge of ecology and/or biochemistry.For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)**BIOL 440. Global Change Ecology - CUE** 3 Units**Term Typically Offered:** Fall Only**Prerequisite(s):** ENVS 363 or ENVS 365; or permission of instructor.**Description:** Human causes of global-scale changes in climate, air and water resources, and biodiversity, and impacts on people; approaches to addressing these problems that promote sustainable societies.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)**BIOL 443. Developmental Biology - CUE** 3 Units**Term Typically Offered:** Spring Only**Prerequisite(s):** BIOL 329 and BIOL 330.**Description:** Developmental biology approached from a biochemical, cellular, and anatomical perspective with emphasis on vertebrate systems.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

|   |                |  |                |
|---|----------------|--|----------------|
| <b>BIOL 445. Stem Cell Biology</b><br><b>Term Typically Offered:</b> Fall Even Years<br><b>Prerequisite(s):</b> BIOL 240, BIOL 242, BIOL 329, and BIOL 330.<br><b>Description:</b> This course provides an overview of different topics in stem cell biology. Students will learn about stem cell fundamentals, applications, and topics related to stem cells. In addition, students will be exposed to both primary and review literature and will engage in discussions and presentations throughout class.<br><b>Note:</b> Formerly offered as BIOL 390 (Special Topics).   | <b>3 Units</b> | <b>BIOL 465. Principles of Physiology</b><br><b>Term Typically Offered:</b> Spring Only<br><b>Prerequisite(s):</b> BIOL 329 or consent of instructor.<br><b>Description:</b> A general study of the functions of organ systems in vertebrates.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>3 Units</b> |
| <b>BIOL 450. Cancer Biology</b><br><b>Term Typically Offered:</b> Fall Only<br><b>Prerequisite(s):</b> BIOL 330 with C or better This course examines the development of cancer at the cellular and molecular levels.<br><b>Description:</b> Topics covered include tumor suppressors, oncogenes, cell cycle regulation, apoptosis, telomerase, angiogenesis, and metastasis. Cancer prevention, screening, diagnosis, and treatment will also be introduced.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>3 Units</b> | <b>BIOL 480. Introduction to Immunology - WR</b><br><b>Term Typically Offered:</b> Occasionally Offered<br><b>Prerequisite(s):</b> BIOL 240, BIOL 242, BIOL 329 and BIOL 330; CHEM 201 and CHEM 202 or their equivalent.<br><b>Description:</b> Lectures will present the basic principles of immunology, with an emphasis on reading and understanding primary literature. Topics include cells and organs of the immune system, the innate and adaptive response, effector molecules, and diseases of the immune system.<br><b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>3 Units</b> |
| <b>BIOL 457. Microbiology</b><br><b>Term Typically Offered:</b> Fall Only<br><b>Prerequisite(s):</b> BIOL 329 and BIOL 330.<br><b>Description:</b> A comprehensive introduction to the wide world of bacteria, viruses, and archaea and how they evolved to be so different from plants and animals. This course will delve into the basic architecture of microbial cells and their processes and discuss how microbes impact human health and disease.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )   | <b>3 Units</b> | <b>BIOL 485. Microbial Physiology - CUE, WR</b><br><b>Term Typically Offered:</b> Fall Only<br><b>Prerequisite(s):</b> BIOL 357 or BIOL 540; or permission of the instructor.<br><b>Description:</b> An explanation of microbial cell biology and the processes, reactions, and energetics that support microbial life in a variety of circumstances. Includes discussions of how to modify those metabolic properties to meet new demands and conditions. A general understanding of the fundamental concepts of organic chemistry is strongly recommended.<br><b>Note:</b> Approved for the Arts and Sciences upper-level requirement in communications (WR).<br><b>Course Attribute(s):</b> CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.  | <b>3 Units</b> |
| <b>BIOL 458. Microbiology Laboratory</b><br><b>Term Typically Offered:</b> Fall, Spring<br><b>Prerequisite(s):</b> BIOL 329 and BIOL 330.<br><b>Fee:</b> An additional \$25.00 is charged for this course.<br><b>Description:</b> This lab will teach students how to work with bacteria, including human pathogens. Students will learn how to classify and identify bacteria using lab techniques and will learn about the diversity of microbes in their environment, including those found in food, on common surfaces, and natural environments. Students will also explore the<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> ) | <b>1 Unit</b>  | <b>BIOL 490. Biology Internship - CUE, WR</b><br><b>Term Typically Offered:</b> Fall, Spring<br><b>Prerequisite(s):</b> Junior standing, 2.5 GPA, and consent of instructor.<br><b>Description:</b> Practical work experience in biological fields.<br><b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br><b>Course Attribute(s):</b> CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.  | <b>3 Units</b> |
| <b>BIOL 460. Advanced Human Anatomy</b><br><b>Term Typically Offered:</b> Fall Only<br><b>Prerequisite(s):</b> BIOL 240, BIOL 241, BIOL 242, BIOL 243, and BIOL 329.<br><b>Description:</b> FOR BIOLOGY MAJORS ONLY. An advanced study of the anatomical structure of the human body. Body structure will be studied by organ systems and will involve a balance between gross anatomical study and histology. Structure-function relationships will be emphasized. Knowledge will be applied to clinical scenarios.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )   | <b>3 Units</b> | <b>BIOL 490. Biology Internship - CUE, WR</b><br><b>Term Typically Offered:</b> Fall, Spring<br><b>Prerequisite(s):</b> Junior standing, 2.5 GPA, and consent of instructor.<br><b>Description:</b> Practical work experience in biological fields.<br><b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br><b>Course Attribute(s):</b> CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> ) | <b>3 Units</b> |



**BIOL 501. Independent Study** 1-3 Units

**Prerequisite(s):** Faculty consent, minimum cumulative GPA of 3.0, and completion of biology core.

**Description:** Independent study in a selected subject area with a student-selected faculty member.

**Note:** No more than 6 hours of Undergraduate Research (BIOL 404, BIOL 405 or BIOL 406 WR) or Independent Study (BIOL 501, BIOL 502 or BIOL 504 WR) may be used to meet the minimum in Biology for the BA or BS.

**Course Attribute(s):** CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 502. Independent Study** 1-3 Units

**Prerequisite(s):** Faculty consent, minimum cumulative GPA of 3.0, and completion of biology core.

**Description:** Independent study in a selected subject area with a student-selected faculty member.

**Note:** No more than 6 hours of Undergraduate Research (BIOL 404, BIOL 405 or BIOL 406 WR) or Independent Study (BIOL 501, BIOL 502 or BIOL 504 WR) may be used to meet the minimum in Biology for the BA or BS.

**Course Attribute(s):** CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 504. Independent Study - WR** 1-3 Units

**Term Typically Offered:** Occasionally Offered

**Prerequisite(s):** Faculty consent, minimum cumulative GPA of 3.0, and completion of the Biology core.

**Description:** Independent study in a selected subject area with a student-selected faculty member.

**Note:** No more than 6 hours of Undergraduate Research (BIOL 404, BIOL 405 or BIOL 406 WR) or Independent Study (BIOL 501, BIOL 502 or BIOL 504 WR) may be used to meet the minimum in Biology for the BA or BS.

**Note:** Approved for the Arts and Sciences upper-level requirement in written communication (WR).

**Course Attribute(s):** CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 510. Behavioral Ecology** 3 Units

**Term Typically Offered:** Occasionally Offered

**Prerequisite(s):** BIOL 363.

**Description:** Evolution of behavioral adaptations for survival and reproduction; topics will include foraging, aggression, mate choice, mating strategies, and sociality.

**Note:** Credit may not be earned for both BIOL 510 and BIOL 610.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 511. Behavioral Endocrinology - WR, CUE** 3 Units

**Term Typically Offered:** Occasionally Offered

**Prerequisite(s):** BIOL 329 or consent of instructor; BIOL 465 recommended.

**Description:** Interactions of hormones, brain, behavior. Approved for the Arts and Sciences upper-level requirement in written communication (WR).

**Note:** Credit may not be earned in both BIOL 511 and BIOL 611.

**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 512. Endocrinology** 3 Units

**Prerequisite(s):** BIOL 465.

**Description:** Chemical regulation in animals.

**Note:** Credit may not be earned in both BIOL 512 and BIOL 612.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 514. Ornithology** 3 Units

**Prerequisite(s):** BIOL 242 and BIOL 244, or consent of instructor.

**Fee:** An additional \$40.00 is charged for this course.

**Description:** Evolution, morphology, diversity, ecology, and behavior of birds. Lab stresses field identification of birds.

**Note:** Credit may not be earned in both BIOL 514 and BIOL 614.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

**BIOL 515. Environmental Physiology** 3 Units

**Term Typically Offered:** Occasionally Offered

**Prerequisite(s):** BIOL 240, BIOL 242 and BIOL 244 (or equivalent); or permission of department.

**Description:** Study of the physiological, morphological, behavioral and biochemical responses by eukaryotic organisms (primarily animals) to major physical and chemical factors of their environment.

**Note:** Credit may not be earned in both BIOL 515 and BIOL 615.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

|  |                |   |                |
|--|----------------|---|----------------|
| <b>BIOL 519. Ichthyology</b><br><b>Prerequisite(s):</b> BIOL 363.<br><b>Fee:</b> An additional \$40.00 is charged for this course.<br><b>Description:</b> Introduction to anatomy, physiology, ecology, distribution, economic importance, and classification of major groups and representative local species of fish.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )   | <b>3 Units</b> | <b>BIOL 542. Gene Structure and Function - WR</b><br><b>Prerequisite(s):</b> BIOL 330 or equivalent, or consent of instructor.<br><b>Description:</b> Advanced topics in genetics of prokaryotes and eukaryotes, including chromosome structure and function, and gene regulation.<br><b>Note:</b> Approved for the Arts & Sciences upper-level requirement in written communication (WR).<br><b>Note:</b> Credit may not be earned for both BIOL 542 and BIOL 642.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>3 Units</b> |
| <b>BIOL 522. Aquatic Ecology</b><br><b>Prerequisite(s):</b> BIOL 363.<br><b>Description:</b> Ecological processes in aquatic environments with primary emphasis on lakes and reservoirs.<br><b>Note:</b> Credit may not be earned in both BIOL 522 and BIOL 622.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>4 Units</b> | <b>BIOL 548. Experimental Design and Analysis - CUE, WR</b><br><b>Prerequisite(s):</b> BIOL 350 or BIOL 651.<br><b>Description:</b> Move principles of sound experimental design, analysis and presentation from recognition to active vocabulary. Students completing the course can serve as statistical consultants for moderately complex statistical designs.<br><b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br><b>Course Attribute(s):</b> CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> ) | <b>3 Units</b> |
| <b>BIOL 540. Metabolic Biochemistry</b><br><b>Term Typically Offered:</b> Occasionally Offered<br><b>Prerequisite(s):</b> BIOL 329 and CHEM 342.<br><b>Description:</b> An advanced study of metabolic pathways including synthesis of macromolecules (proteins, nucleic acids, lipids, carbohydrates), mechanisms of metabolic control and utilization of metabolic intermediates.<br><b>Note:</b> Credit may not be earned in both BIOL 540 and BIOL 640.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )   | <b>3 Units</b> | <b>BIOL 552. Evolutionary Medicine</b><br><b>Term Typically Offered:</b> Occasionally Offered<br><b>Prerequisite(s):</b> BIOL 240, BIOL 242, BIOL 372, or BIOL 409, or equivalents.<br><b>Description:</b> In-depth analyses at the interface of evolutionary biology and the health sciences using readings from the primary literature. Format involves lectures, discussion, and a library-based research project.<br><b>Note:</b> Credit may not be earned in both BIOL 552 and BIOL 652.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>3 Units</b> |
| <b>BIOL 541. Medicinal Plant Biochemistry - CUE, WR</b><br><b>Term Typically Offered:</b> Occasionally Offered<br><b>Prerequisite(s):</b> BIOL 540, CHEM 445, CHEM 545, or BIOC 545.<br><b>Fee:</b> An additional \$40.00 is charged for this course.<br><b>Description:</b> A detailed study of biosynthesis and bioactivity of specialized plant metabolites (secondary metabolites). Topics will include aspects of general plant metabolism as well as specialized metabolism pathways (alkaloids, terpenes and phenolics) and will include a survey of approaches as they relate to discovery of bioactive plant metabolites and a review of known plant metabolites used to treat human diseases/disorders.<br><b>Note:</b> Approved for the Arts and Sciences upper-level requirement in written communication (WR).<br><b>Course Attribute(s):</b> CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> ) | <b>3 Units</b> | <b>BIOL 553. Chronic Disease Biology</b><br><b>Term Typically Offered:</b> Occasionally Offered<br><b>Prerequisite(s):</b> BIOL 329 and BIOL 372.<br><b>Description:</b> The course will cover the biological bases of chronic disease, with an emphasis on the mechanisms of disease causation and the evolution of these mechanisms.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )   | <b>3 Units</b> |
| <b>BIOL 544. Microbial Ecology</b><br><b>Prerequisite(s):</b> BIOL 357, or BIOL 485, or consent of instructor.<br><b>Description:</b> Interrelationships between microorganisms and their environments.<br><b>Note:</b> Credit may not be earned in both BIOL 544 and BIOL 655.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )   | <b>3 Units</b> | <b>BIOL 555. Microbial Ecology</b><br><b>Prerequisite(s):</b> BIOL 357, or BIOL 485, or consent of instructor.<br><b>Description:</b> Interrelationships between microorganisms and their environments.<br><b>Note:</b> Credit may not be earned in both BIOL 555 and BIOL 655.<br>For class offerings for a specific term, refer to the Schedule of Classes ( <a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a> )  | <b>3 Units</b> |

|  |  |
|--|--|
| <p><b>BIOL 560. Ecology of Urban and Suburban Landscapes</b> <b>3 Units</b><br/> <b>Term Typically Offered:</b> Spring Odd Years<br/> <b>Prerequisite(s):</b> BIOL 363 or GEOS 365.<br/> <b>Description:</b> Effects of cities and suburban sprawl on air and water chemistry, microclimate, fragmented landscapes, and responses of biotic and human communities to these conditions that degrade or promote urban resilience, adaptation and sustainability.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 571. Selected Topics</b> <b>3 Units</b><br/> <b>Term Typically Offered:</b> Occasionally Offered<br/> <b>Description:</b> Contents to be indicated in schedule of courses.<br/> <b>Course Attribute(s):</b> CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>                     |
| <p><b>BIOL 562. Ecosystems Ecology</b> <b>3 Units</b><br/> <b>Term Typically Offered:</b> Spring Even Years<br/> <b>Prerequisite(s):</b> BIOL 363; an advanced ecology course recommended.<br/> <b>Description:</b> The transformations of matter and energy that link plant, animal and geochemical cycles. Implications for resource management also discussed.<br/> <b>Note:</b> Credit may not be earned in both BIOL 562 and BIOL 662.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   | <p><b>BIOL 572. Selected Topics-Laboratory</b> <b>1-4 Units</b><br/> <b>Description:</b> Contents to be indicated in schedule of courses.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   |
| <p><b>BIOL 563. Population and Community Ecology</b> <b>3 Units</b><br/> <b>Term Typically Offered:</b> Spring Only<br/> <b>Prerequisite(s):</b> BIOL 363.<br/> <b>Description:</b> Introduction to population dynamics and species interactions in aquatic and terrestrial ecosystems. Review of underlying ecological theory and its applications for conserving biodiversity.<br/> <b>Note:</b> Credit may not be earned in both BIOL 563 and BIOL 663.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 591. Biology for Teachers I</b> <b>3 Units</b><br/> <b>Term Typically Offered:</b> Occasionally Offered<br/> <b>Prerequisite(s):</b> Experience in teaching biology or biological principles in elementary, middle or secondary school.<br/> <b>Description:</b> Teaching pre-college biology with emphasis on curriculum content, laboratory procedures, and process skills.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  |
| <p><b>BIOL 567. Conservation Biology</b> <b>3 Units</b><br/> <b>Term Typically Offered:</b> Spring Only<br/> <b>Prerequisite(s):</b> BIOL 263 or BIOL 363 or permission of instructor.<br/> <b>Description:</b> This course provides an overview of theory and practice of conservation. Topics include biodiversity, habitat loss, the effects of habitat changes on populations, and the design and establishment of reserves. Among other things, students will learn: 1) key terms and concepts related to biodiversity, 2) significant threats to biodiversity and efforts to mitigate them, and 3) practical and socioeconomic elements of conservation biology.<br/> <b>Note:</b> Credit may not be earned for both BIOL 567 and BIOL 667.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> | <p><b>BIOL 593. Experimental Cell Biology for Teachers</b> <b>3 Units</b><br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 242, BIOL 244, BIOL 329, BIOL 330, and BIOL 331 or equivalent; or consent of instructor.<br/> <b>Description:</b> Lecture and lab activities focused on inquiry-based investigations at the cellular level suitable for secondary school classroom.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>   |
| <p><b>BIOL 569. Evolution</b> <b>3 Units</b><br/> <b>Prerequisite(s):</b> BIOL 363.<br/> <b>Description:</b> Offers a comprehensive overview of evolution and provides students with a review of issues that make up this critical discipline.<br/> <b>Note:</b> Credit may not be earned in both BIOL 569 and BIOL 669.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>  | <p><b>BIOL 594. Experimental Botany for Teachers</b> <b>3 Units</b><br/> <b>Prerequisite(s):</b> BIOL 240, BIOL 242, BIOL 244, BIOL 329, BIOL 330, BIOL 331 or equivalent, or consent of instructor.<br/> <b>Description:</b> This course is designed for pre-service and classroom teachers of the life sciences from elementary through high school. To increase teachers' abilities to teach sciences, especially botany, using inquiry-oriented strategies.<br/>                     For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p> |