Faculty
Lemmons - Head, Bay, Creamer, Davis, Dennis, Fletcher, Fraser, Heth, Johnson, Kennedy, Messick, Peters, Plucinski, Roettger, Schlins, Wells

Mission
Our mission is to provide a stimulating and challenging Biology curriculum, excellence in teaching, quality academic advising, outstanding general education courses and dedicated community and university service, as well as international opportunities for students.

Coursework within biology can encompass a wide range of topics including anatomy, botany, cell biology, ecology, evolution, physiology, zoology and many others. The curriculum for a Bachelor of Science with a Major in Biology is arranged into three areas of study in order to highlight courses that are most appropriate for a particular area of interest.

Biomedical Sciences, Students interested in pre-dental, pre-medical, pre-optometry, pre-pharmacy, pre-physician assistant, pre-physical therapy or pre-veterinary studies should consider courses that are listed within the area of biomedical sciences. Many of these courses may be required by professional schools such as medical schools or pharmacy schools.

Field/Conservation Biology, Students interested in botany, conservation, ecology, evolution, marine biology, wildlife, zoology, or other related topics should consider courses that are listed within the area of field or conservation biology. These courses provide a solid educational background for students wanting to pursue graduate studies or careers in these related areas.

General Biology, Students interested in a more broad range of biological topics should consider courses that are listed within the area of general biology. These courses provide a diverse educational background that would allow students to pursue graduate studies or careers in a wide range of biological sciences.

A Bachelor of Science in Biology with the Bioinformatics Option provides for a double major in Biology and Computer Information Science. Bioinformatics is a discipline that prepares students for careers in designing and implementing computational algorithms for managing, processing, and analyzing databases or genetic sequences.

A Bachelor of Science in Biology with the Forensic Science Option provides for a double major in Biology and Forensic Science. Forensic Science is the application of the broad use of biological and biochemical techniques to obtain criminal or other legal evidence.

A Bachelor of Science in Education with a Major in Unified Science, Biology Endorsement will allow students to teach introductory level courses in biology, chemistry, earth science, and physics and to teach advanced courses in biology at the secondary level.

A Bachelor of Science in Education with a Biology Certification will allow students to teach introductory and advanced level courses in biology at the secondary level.

Internships are encouraged for biology majors. These internships allow the students to gain practical experience in a work or research setting. Students work under the joint supervision of a faculty member and a representative of the institute providing the intern experience.

Bachelor of Science with a Major in Biology
Major Codes BI01-BI10

General Education Requirements (p. 45) 46-47* . . . 34-35

Semester Hours

<table>
<thead>
<tr>
<th>Biology Requirements</th>
<th>. . . 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 110 Principles of Biology I</td>
<td>. . . 4</td>
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<tr>
<td>BIO 111 Principles of Biology II</td>
<td>. . . 4</td>
</tr>
<tr>
<td>BIO 210 Molecular Biology*** (WI)</td>
<td>. . . 4</td>
</tr>
<tr>
<td>BIO 231 General &amp; Medical Microbiology</td>
<td>. . . 5</td>
</tr>
<tr>
<td>BIO 305 Genetics*** (WI)</td>
<td>. . . 4</td>
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<tr>
<td>BIO 402 General Ecology*** (WI)</td>
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<td>OR</td>
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<tr>
<td>BIO 481 Aquatic Ecology*** (WI)</td>
<td>. . . 4</td>
</tr>
<tr>
<td>BIO Electives (200 level or higher)</td>
<td>. . . 15**</td>
</tr>
</tbody>
</table>

Supporting Requirements

Math 140 Algebra & Trigonometry (MATH 130 + MATH 135 = MATH 140) . . . 25

Electives ........................................................................ 24-25

Total ............................................................................. 124****

*Required courses in biology, chemistry, mathematics and physics satisfy major requirements and 12 hours of the General Education Requirements.

**Electives should be chosen based on the following divisions:

Biomedical Sciences ..................................................... 15

Recommended courses: BIO 201 or 331, 240, 290, 301, 308, 350, 361, 362, 370, 380, 431, 433, 442, 450, 455, 456, 464, 490, 498, 499

Field/Conservation Biology .......................................... 15

Recommended courses: BIO 250, 290, 300, 302, 303, 304, 312, 316, 322, 331, 332, 352, 361, 370, 422, 431, 440, 450, 455, 456, 464, 490, 498, 499

General Biology ......................................................... 15

Recommended courses:-- two from each of the following:

Biomedical Sciences electives

Field/Conservation Biology electives

***This combination of required courses fulfills computer literacy requirement.

****Must include at least 40 Upper Division (300 - 400 level) hrs.

Although not required for the BS in Biology, some students may need additional courses to meet admission requirements for professional or graduate school. Students should contact their adviser and prospective professional or graduate school for information regarding the specific courses required.

Bachelor of Science in Biology and Computer Information Science

Bioinformatics Option

Major Code BI00

General Education Requirements (p. 45) 46-47* . . . 34-35

Semester Hours

<table>
<thead>
<tr>
<th>Biology Core ..........................................................</th>
<th>. . . 33</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 101 General Biology</td>
<td></td>
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<tr>
<td>OR</td>
<td></td>
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<tr>
<td>BIO 105 General Biology: Environmental Health Emphasis</td>
<td>. . . 4</td>
</tr>
<tr>
<td>BIO 210 Molecular Biology (WI)</td>
<td>. . . 4</td>
</tr>
</tbody>
</table>
BIO 231 General & Medical Microbiology .................. 5
BIO 305 Genetics (WI) .................................. 4
BIO 405 Bioinformatics .................................. 3
BIO Upper Division Electives* .................................. 13
CIS Core .................................................................. 33
CIS 110 Programming I ............................................. 3
CIS 202 Information System I ...................................... 3
CIS 210 Programming II ............................................ 3
CIS 310 Database Management System I ....................... 3
CIS 315 Computer Networks ...................................... 3
CIS 345 UNIX System Administration ......................... 3
CIS 350 Data Structures .......................................... 3
CIS 375 IT Project Management .................................. 3
CIS 410 Information System II (WI) ......................... 3
CIS 425 Database Management II (WI) ..................... 3
CIS 450 Operating Systems (WI) .............................. 3
Supporting Requirements ......................................... 18
BIO 290 Research/Statistical Methods (WI) .................. 3
CHEM 120 Chemistry for the Allied Health Sciences ........ 5
MATH 140 Algebra and Trigonometry ......................... 5
PHYS 151 Elementary College Physics I ..................... 5
Electives .................................................................. 6-7
Total .................................................................... 124

*Required courses in biology, chemistry, mathematics and physics satisfy major requirements and 12 hours of the General Education Requirements.
**Chose from the following courses: BIO 301, BIO 303, BIO 304, BIO 308, BIO 350, BIO 362, BIO 431, BIO 440, BIO 442, BIO 450, BIO 456, BIO 464 and BIO 499.
Only computer information science courses in which a student has earned a grade of 'C' or above can be used to satisfy departmental requirements.

Bachelor of Science in Biology and Biochemistry Forensic Science Option
Major Code BI03

Semester Hours

General Education Requirements (p. 45) 46-47* ........ 34-35
Biology and Chemistry Requirements ......................... 71-73
BIO 121 Human Anatomy & Physiology I .................. 4
BIO 210 Molecular Biology (WI) .............................. 4
BIO 221 Human Anatomy & Physiology II .................. 5
BIO 231 General & Medical Microbiology .................. 5
BIO 290 Research & Statistical Methods (WI) .......... 5
BIO 305 Genetics (WI) ............................................ 4
CHEM 151 General Chemistry I .................................. 5
CHEM 152 General Chemistry II ............................... 5
CHEM 201 Analytical Chemistry I ............................. 5
CHEM 301 Organic Chemistry I .................................. 5
CHEM 302 Organic Chemistry II (WI) ......................... 5
CHEM 350 Biochemistry I ......................................... 3
CHEM 355 Biochemical Techniques (WI) .................... 3
CHEM 400 Elementary Physical Chemistry .................. 2
CHEM 427 Instrumental Analysis ............................... 5
Select one: .................................................................. 3-5
BIO 362 Virology (3)
BIO 442 Pathogenic Bacteriology (5)
BIO 456 Immunology (4)

Supporting Requirements ........................................ 14
MATH 140 Algebra and Trigonometry ......................... 5
PHYS 151 Elementary College Physics I ..................... 5
PHYS 152 Elementary College Physics II .................... 4
Electives .................................................................. 2-5
Total .................................................................... 124

*Required courses in biology, chemistry, mathematics, physics and psychology satisfy major requirements and 15 hrs. of the General Education Requirements. Courses listed may have additional prerequisite requirements that will need to be met before taking the course.

Bachelor of Science in Education with a Major in Unified Science, Biology Endorsement
Major Code E00

Semester Hours

General Education Requirements (p. 45) 46-47* ........ 32-33
EDUC 301 Technology in Education .......................... 3
Biology Requirements ............................................. 36-38
Required Biology Courses ........................................ 12
BIO 110 Principles of Biology I (4)
BIO 111 Principles of Biology II (4)
BIO 121 Anatomy & Physiology I (4)
Microbiology, Genetics, Cell Biology & Biochemistry and Evolution ..................... 17-18
BIO 305 Genetics (4)
BIO 210 Molecular Biology (4)
BIO 231 General and Medical Microbiology (5)
BIO 221 Human Anatomy and Physiology II (5)
OR
BIO 301 Human Physiology (4)
OR
BIO 331 Comparative Vertebrate Anatomy (5)

Botany - select one .................................................. 3-4
BIO 316 Economic Botany (3)
BIO 322 Taxonomy of Flowering Plants (4)
BIO 440 Plant Pathology (4)
Ecology - select one .................................................. 4
BIO 312 Environmental Biology (4)
BIO 402 General Ecology (4)
BIO 481 Aquatic Ecology (4)

Supporting Requirements ........................................... 35
PHIL 420 Philosophy of Science
OR
Approved Substitute .................................................. 3
MATH 140 Algebra and Trigonometry ......................... 5
(MATH 130 + MATH 135 = MATH 140)
CHEM 151 General Chemistry I ............................... 5
CHEM 152 General Chemistry II ............................... 5
PHYS 151 Elementary College Physics I ..................... 5
PHYS 152 Elementary College Physics II .................... 4
GEOL 120 Introduction to Geology ............................ 4
GEOL 185 Introduction to Meteorology ..................... 4
Education Requirements (p. 179) .................................. 37-38
Total .................................................................... 143-147

*Required courses in biology, chemistry, mathematics, physics and psychology satisfy major requirements and 15 hrs. of the General Education Requirements. Courses listed may have additional prerequisite requirements that will need to be met before taking the course.
Bachelor of Science in Education
with a Biology Certification
Major Code ES09

Semester Hours

General Education Requirements (p. 45) 46-47* .......... 32-33
EDUC 301 Technology in Education .......................... 3
Biology Requirements ........................................... 34
Animal Form and Function ................................... 13
BIO 110 Principles of Biology I (4)
BIO 121 Anatomy & Physiology I (4)
BIO 221 Anatomy & Physiology II (5)

Biology Elective - Environmental/Earth Science:
Select one ......................................................... 4
BIO 312 Environmental Biology (4)
BIO 402 General Ecology (4)
BIO 481 Aquatic Ecology (4)

Supporting Requirements ..................................... 27
PHIL 420 Philosophy of Science

OR
Approved Substitute ............................................. 3
MATH 140 Algebra and Trigonometry .......................... 5
(MATH 130 + MATH 135 = MATH 140)
CHEM 151 General Chemistry I ............................... 5
CHEM 152 General Chemistry II .............................. 5
PHYS 151 Elem College Physics I .............................. 5
PHYS 152 Elem College Physics II ............................ 4

Education Requirements (p. 179) ......................... 36-39
Total ................................................................. 132-136

*Required courses in biology, chemistry, mathematics, physics and psychology satisfy major requirements and 15 hrs. of the General Education Requirements. Courses listed may have additional prerequisite requirements that will need to be met before taking the course.

Minor in Biology
Requires a minimum of 20 biology credit hours. At least 6 credit hours must be upper division (300-400 level) and at least 12 credit hours must be 200 level or above. Courses must be chosen in consultation with an academic adviser from the Department of Biology and Environmental Health.

For additional information contact:
Dr. Crystal Lemmons, Department Head
Office: Reynolds Hall 215
Phone: 417.625.9592
Email: lemmmons-c@mssu.edu

Course Descriptions

BIO 0070 (F,S) .................................................. 2 hrs. cr.
Introduction to Life Sciences
An introductory course that focuses on the basic scientific principles of biological molecules, cellular biology and use of scientific terminology. Emphasis will be placed on examples of human biology and prepares students for further study in the biomedical sciences, allied health professions and other science majors. No credit toward baccalaureate degree.

BIO 0100 (Demand) ........................................... 1 hr. cr.
Freshman Seminar
Designed to give formal and informal instruction to incoming Biology majors on careers in Biology, internships and provide opportunities for students to become actively involved with departmental programs. Recommended for all Biology majors.

BIO 0101 (F,S,Su) .............................................. 4 hrs. cr.
General Biology
A survey of general biological principles that emphasize concepts relevant to the student. Special topics may be used to illustrate course content. Three one-hour lectures, one 2-hour laboratory per week. Fulfills General Education requirements for Area D1. Does not fulfill biology degree requirements.

BIO 0105 (Demand) ............................................ 4 hrs. cr.
General Biology: Environmental Health Emphasis
A general biology course that emphasizes environmental health. The organization, complexity and interdependency of life is revealed through the study of life chemistry, cells, organisms, respiration, photosynthesis, genetics, populations, evolution and ecology. Emphasis is placed on protection of the human environment with discussion of environmental issues and environmentally related public health concerns. Three lectures, one two hour lab per week. Fulfills general education requirement in Area D1. An introductory biology course for science majors and those interested in the environment, but does not fulfill the introductory course requirements for biology majors.

BIO 0110 (F,S) .................................................. 4 hrs. cr.
Principles of Biology I
First in a two-course introductory sequence for biology majors. The unifying principles of living organisms including scientific method, biological molecules, cell structure, function and metabolism, genetics, evolution, and a survey of Prokaryotes, Protists, and Fungi. Three lectures, one 3-hour lab per week. Fulfills general education requirements for Area D1. Prerequisites: BIO 101 or BIO 105; or an ACT composite score of 21 or higher. High school chemistry strongly recommended.

BIO 0111 (F,S) .................................................. 4 hrs. cr.
Principles of Biology II
A continuation of BIO 110 to include the evolution, diversity, structure, function and ecology of plants and animals. Three lectures, one 3-hour lab per week. Prerequisites: BIO 110 with a grade of ‘C’ or better.

BIO 0121 (F,S,Su) .............................................. 4 hrs. cr.
Human Anatomy and Physiology I
The first in a two-course sequence in which human anatomy and physiology are studied using a body system approach. Includes the concept of scientific inquiry and the fundamental concepts of cell biology, cell metabolism, and genetics. Three lectures and one, 2-hour lab per week. Fulfills the General
Education requirements in Area D1. Prerequisite: ACT composite score of 19 or higher or a satisfactory score on a Departmental Assessment or BIO 0070 with a grade of "C" or better.

BIO 0201  (F,S)  5 hrs. cr.  Human Anatomy
A general treatment of human anatomy from the tissue through the organ system levels of organization. The lecture provides the conceptual and organizational framework for laboratory, which utilizes microscopy, dissection, anatomical models and anatomical software. Three hours of lecture, two 2-hour labs per week. Credit toward the biology major granted for one anatomy course: BIO 201 or BIO 331. Prerequisite: BIO 101 or BIO 105 or BIO 111.

BIO 0210  (F,S)  4 hrs. cr.  Molecular Biology  (Writing Intensive)
Physiological characteristics and function at the molecular levels of both plant and animal cells. Three lectures, one 2-hour lab per week. Prerequisites: BIO 111 and CHEM 152.

BIO 0221  (F,S,Su)  5 hrs. cr.  Human Anatomy and Physiology II
A continuation of BIO 121 - Anatomy and Physiology I. A systems approach will be used to emphasize the interrelationships between form and function at the gross and microscopic levels of human organization. Three lectures and two, 2-hour labs per week. Prerequisite: BIO 121.

BIO 0231  (F,S,Su)  5 hrs. cr.  General and Medical Microbiology
Structure and function of microorganisms. Topics include general principles of microbiology, immunology and identification of microorganisms. Three lectures and two, 2-hour labs per week. Prerequisites: BIO 111 (or BIO 121) and CHEM 120 or 151.

BIO 0240  (S)  3 hrs. cr.  Radiation Biology
Survey of various types of radiation affecting humans, the uses of radiation and methods for monitoring radiation levels. Emphasis on the physiological damage that occurs to tissues following ionizing radiation. Three lectures per week. Prerequisites: Five hrs. of chemistry or acceptance into the School of Radiologic Technology.

BIO 0250  (Demand)  4 hrs. cr.  Principles of Botany
Anatomy and morphology of the plant kingdom emphasizing botanical aspects of cell biology, chemistry, genetics, physiology and plant defenses. Advantages of evolutionary adaptations evidenced as students are introduced to the diversity of plants. Prerequisite: BIO 111.

BIO 0290  (F-Even)  3 hrs. cr.  Research and Statistical Methods in Biology  (Writing Intensive)
Develops literature research, experimental design and statistical analysis skills required in biology and environmental health. Students learn both mathematical foundations and software applications of statistical methods. Students develop a research question, search literature, design a study and write a proposal. Prerequisites: BIO 101 or BIO 105 or BIO 111 and MATH 140.

BIO 0298  (Demand)  1-5 hrs. cr.  Topics in Biology
Designed to give instruction in some discipline of biology not covered in other courses. Prerequisites to be determined by department.

BIO 0300  (S-Even)  3 hrs. cr.  Evolution
Course designed to enhance the understanding and appreciation of the modern scientific theory of evolution. Evidence and mechanics of evolution exemplified by molecular biology, systematics, genetics and population ecology will be included as well as samples of current evolutionary research. Prerequisites: BIO 101 or BIO 105 or BIO 111.

BIO 0301  (F)  4 hrs. cr.  Human Physiology
A general treatment of normal human physiology which emphasizes physiological control and homeostasis at the organ system level of organization. Lecture focuses on physiological processes and concepts; the lab emphasizes the measurement of physiological variables. Three lectures, one 3-hour lab per week. Credit toward the biology major granted for one physiology course: BIO 221, BIO 301 or BIO 431. Prerequisite: BIO 111 or BIO 201 and CHEM 120 or higher.

BIO 0302  (F-Even)  3 hrs. cr.  Conservation Biology
The study of the conservation of biodiversity based on the principles of ecology, evolution, and genetics. This course focuses on ecological and evolutionary principles relevant to conservation, levels of and threats to biodiversity, and practical aspects of conservation, within the context of a human dominated earth. Three lectures per week. Prerequisite: BIO 111.

BIO 0303  (Demand)  3 hrs. cr.  Computer Applications Biology
Explores ways in which microcomputers are used to better understand and study biological phenomena. The course develops technical expertise that is required in research, graduate school, teaching and other career fields. Prerequisites: BIO 101 or BIO 105 or BIO 111.

BIO 0304  (F-Odd)  3 hrs. cr.  Geographic Information Systems
Explores the expanding use of Geographic Information Systems (GIS) in ecology, environmental health and related fields. Satisfies the computer literacy requirement for environmental health majors. Prerequisites: BIO 101 or BIO 105 or BIO 111 or BIO 121. Cross-listed as EH 304 and GEOG 304.

BIO 0305  (F,S)  4 hrs. cr.  Genetics  (Writing Intensive)
Introduction to principles of heredity, gene structure, expression, and regulation. Emphasis on cytological and molecular approaches to nucleic acid replication, transcription, translation, and other genetic mechanisms. Lab exercises illustrate genetic principles and techniques used in modern genetic research. Three lectures, one 3-hour lab per week. Prerequisite: BIO 111.

BIO 0308  (F,S,Su)  4 hrs. cr.  Pathophysiology
Altered physiological states, the cellular manifestations and causes of disease and adaptation to the alterations. Three lectures, one 3-hour lab per week. Prerequisite: BIO 221 or 301.

BIO 0312  (Su)  4 hrs. cr.  Environmental Biology  (Writing Intensive)
A study of how environmental factors interact with and impact living organisms and ecosystems. Emphasis is on global human ecology, environmental problems, sound environmental management practices and the sustainable use of natural resources. How environmental problems may be solved by the
application of sound environmental science in conjunction with the choices allowed by human values. Three hours of lecture and two hours of lab per week. Prerequisites: BIO 101 or 105 or 111 or 121. Cross-listed as EH 312.

BIO 0316  (S-Even)  3 hrs. cr.
Economic Botany
Economic uses of plants in the past, present and future. Emphasis on economic aspects of plants in medicine, agriculture, horticulture and industry. Includes the history of plant domestication facilitated by natural selection and purposeful breeding and an overview of plant chemistry, morphology and reproduction pertinent to economics. Prerequisites: BIO 111.

BIO 0322  (S-Odd)  4 hrs. cr.
Taxonomy of Flowering Plants
Relationships among selected plant groups with emphasis on classification and descriptions of taxa, nomenclature and concepts concerning the evolutionary sequence of various plant characters. Southwestern Missouri flora emphasized. Two lectures, two 2-hour labs per week. Prerequisite: BIO 111.

BIO 0331  (S)  5 hrs. cr.
Comparative Vertebrate Anatomy
Fundamental course designed to enhance understanding and appreciation of the structure and adaptations of vertebrates. Emphasis on evolution and the relationship between structure and function. Two lectures, two 3-hour labs per week. Credit toward the biology major granted for one anatomy course: BIO 201 or BIO 331. Prerequisite: BIO 111.

BIO 0332  (Demand)  4 hrs. cr.
Introduction to Entomology
Collecting methods, taxonomy, life history, morphology and evolution of insects. Three lectures, one 3-hour lab per week. Prerequisite: BIO 111.

BIO 0350  (S-Even)  2 hrs. cr.
Techniques in Microbiology
Training in techniques in microbiology through analysis of bacterial antibiotic resistance patterns and their medical ramifications. Includes the origin, incidence, effects and prevention of antibiotic resistance. One lecture, one 2-hour lab per week. Prerequisite: BIO 231.

BIO 0352  (Demand)  1-4 hrs. cr.
Biomes
An in-depth study of a selected ecosystem. The interactions between plants and animals with their abiotic environment are studied in the classroom and during an extended field trip usually lasting one week or more. The habitat chosen for study varies from year to year and some trips require physical conditioning or specialized training. Living conditions range from primitive to reasonably comfortable dormitories. Students are required to bear the cost of the trip. Prerequisites: BIO 111 and permission of the instructor.

BIO 0361  (F-Even)  4 hrs. cr.
Parasitology
Systematic investigation of the numerous parasites found in vertebrates. Emphasis on life cycles of parasites that infect humans and domestic animals. Three lectures, one 3-hour lab per week. Prerequisite: BIO 111.

BIO 0362  (F-Even)  3 hrs. cr.
Virology
Structure, classification and life cycles of bacterial, animal and plant viruses, their significance in disease (including cancer) and the use of viruses in modern biological research. The laboratory will stress the cultivation of viruses in bacterial and other cells. Three lectures, one 3-hour lab per week. Prerequisites: BIO 231.
Pathogenic Bacteriology
A study of the structure, identification and pathology of the infectious bacteria. Three lectures, two 2-hour labs per week. Prerequisite: BIO 231.

BIO 0450 (F,S) 0-4 hrs. cr.
Internship in Biology
In conference with a department board a half semester in advance, the student shall elect to work and observe in any area of applied biology in which on-the-job experience would be beneficial to the student's training. Course can be repeated, but a maximum of 4 credit hours can be used to meet the biology major requirements. Prerequisites: Junior standing or above in biology with a minimum of 20 biology hours and 20 upper division hours.

BIO 0455 (F,S,Su) 1-2 hrs. cr.
Laboratory Assistant Practicum
Supervised practical experience in assisting undergraduate students in laboratory techniques in 100 and 200 level Biology classes. A maximum of 2 hours of credit can be applied toward the Biology degree. Prerequisite: advanced standing and permission of instructor of class being assisted.

BIO 0456 (F-Odd) 4 hrs. cr.
Immunology
Cellular and molecular basis of the immune response in vertebrates including structure, induction and regulation of the immune response. Autoimmune disorders, vaccines, transplantation and diagnostic immunology will also be presented. The laboratory will stress the induction and manipulation of the immune response. Three lectures, one 3-hour lab per week. Prerequisite: BIO 231.

BIO 0464 (S) 3 hrs. cr.
Cell Biology
A current perspective on cell biology will be addressed by examining various aspects of cell structure and function. Emphasis will be on communication and regulation mechanisms in both normal and abnormal states. In addition, the historical aspects of cell biology research and the techniques used by researchers will be discussed. Specific topics will be chosen each semester depending on current research with the use of primary literature to illustrate important concepts. Prerequisite: BIO 210.

BIO 0481 (S) 4 hrs. cr.
Aquatic Ecology (Writing Intensive)
Analysis of components of freshwater systems, both impoundment and stream environments. Three lectures, one 2-hour lab per week. Prerequisite: BIO 111.

BIO 0490 (Demand) 1 hr. cr.
Seminar
Faculty supervised discussion group and critical review of current topics in biology. Students will present reviews in selected topics. One meeting per week. Prerequisites: For upper division biology majors. May be repeated for additional credit.

BIO 0495 (Demand) 2-3 hrs. cr.
Roots of Science
The course will explore the history and lives of scientists who made significant contributions in Biology or sciences impacting Biology. Travel to the scientists' homeland or site of their research will be included to emphasize the historical components of their lives and research. Cultural sites associated with the scientists will also be visited to emphasize society's role in their conclusions. Students will be responsible for travel expenses. Prerequisite: Determined by instructor when offered.

BIO 0498 (Demand) 1-5 hrs. cr.
Advanced Topics in Biology
Designed to give advanced instruction in some discipline of biology not covered in other courses. For upper division majors. Prerequisites to be determined by department.

BIO 0499 (Demand) 1-3 hrs. cr.
Independent Research in Biology
Individual work under the supervision of a faculty member, with the credit and hours to be arranged. Research may be undertaken in any field of biology, with adequate preparation and the consent of the supervising instructor, department head and school dean. Prerequisite: Minimum GPA of 3.0 with 90 credit hours completed.

Faculty
Archer - Head, Donelson, Ennis, Garoutte, Gilbert-Saunders, Summerfield

Mission
The Chemical and Physical Sciences Department is a learning community dedicated to:

- providing a curriculum that gives its majors a thorough grounding in the basic principles and methods of chemistry in theory and practice
- offering students ample opportunities for independent research
- providing chemistry courses suitable for students majoring in other fields
- offering courses in support of the health sciences
- providing a positive environment for students, staff and faculty

Chemistry and Biochemistry graduates will find an impressive array of options and exciting opportunities in fields such as basic research, environmental protection, instrumentation, new product and process development, technical marketing, market research, forensic chemistry, teaching at all levels and information science. Moreover, chemistry degrees are valuable in health sciences such as medicine, pharmacology, clinical chemistry and industrial hygiene. The first step into a future in chemistry is a formal education. Since chemistry is such a broad field and holds diverse career opportunities, students should plan their education with a goal in mind.

Bachelor of Arts with a Major in Chemistry
Major Code CH01

Semester Hours

General Education Requirements (p. 45) 46-47* . . . 38-39
Foreign Language (four courses in one language) ............. 12
Chemistry Requirements ........................................ 33
CHEM 151 General Chemistry I* ............................ 5
CHEM 152 General Chemistry II* ........................... 5
CHEM 201 Analytical Chemistry I* .......................... 5
CHEM 301 Organic Chemistry I .............................. 5
CHEM 400 Elementary Physical Chemistry* .............. 4
Upper Division Chemistry Electives (4 hrs) ................. 4
AND
CHEM 302 Organic Chemistry II ............................ 5