PROGRAMS AVAILABLE
BACHELOR OF SCIENCE IN ATHLETIC TRAINING
BACHELOR OF SCIENCE IN BIOLOGY
CONCENTRATION IN PRE-PROFESSIONAL
CONCENTRATION IN PRE-PHYSICAL THERAPY
CONCENTRATION IN MEDICAL TECHNOLOGY
CONCENTRATION IN BIOTECHNOLOGY
CONCENTRATION IN ALLIED HEALTH
BIOLOGY MINOR
TEACHING LICENSURE

BIOLOGY MAJOR PROGRAM
The Department of Biology offers a four-year program leading to a Bachelor of Science in biology. The curriculum is built upon four foundational courses which explore the field of biology from the molecular and cellular level to the level of populations and ecosystems. In these courses, students seek to understand the origin, evolution, and physiological mechanisms of all forms of life. Advanced courses build upon information learned in the foundational courses and allow students to pursue their own areas of interest.

Upon completion of their program, graduates will be able to:
• Understand fundamental concepts in the discipline;
• Write a lab report to communicate the findings of a scientific experiment;
• Design an experiment to test a hypothesis;
• Find and analyze primary literature in the field;
• Demonstrate appropriate technical skills in the laboratory;
• Analyze data with appropriate statistical analysis.

**BIOLOGY MAJOR**

**Requirements**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 101</td>
<td>Biology Seminar for Entering Majors</td>
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<tr>
<td>BIOL 150</td>
<td>Introduction to Biology</td>
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<tr>
<td>BIOL 235</td>
<td>Botany</td>
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<tr>
<td>BIOL 240</td>
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<td>BIOL 245</td>
<td>Zoology</td>
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<tr>
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<tr>
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<td>BIOL 480</td>
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Biology Electives (300 level or above) 9 cr

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<tr>
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<td>CHEM 201</td>
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<td>CHEM 202</td>
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<td>PHYS 132</td>
<td>General Physics II</td>
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<td>MATH 150</td>
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<td>3 cr</td>
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<tr>
<td>Or MATH 220</td>
<td>Calculus I</td>
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<tr>
<td>Or MATH 232</td>
<td>Introduction to Statistics</td>
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</tbody>
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**TOTAL BIOLOGY MAJOR REQUIREMENTS** 62 cr

**CONCENTRATION IN PRE-PROFESSIONAL**

The Biology Department’s pre-professional concentration provides the solid science background necessary for admission to medical, dental, veterinary
and pharmacy school. In addition to class work, pre-professional students are strongly encouraged to gain experience through undergraduate research, clinical internships and volunteer work in the medical field. The Department’s pre-professional concentration facilitates this process.

**PRE-PROFESSIONAL CONCENTRATION**

**Requirements**

<table>
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<th>Course Code</th>
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<td>BIOL 245</td>
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<td>4 cr</td>
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<td>BIOL 310</td>
<td>Animal Physiology</td>
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<td>BIOL 330</td>
<td>Seminar</td>
<td>1 cr</td>
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<td>BIOL 360</td>
<td>Biochemistry</td>
<td>3 cr</td>
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<td>BIOL 480</td>
<td>Cell Biology</td>
<td>4 cr</td>
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<tr>
<td>PHYS 131</td>
<td>General Physics I</td>
<td>4 cr</td>
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<td>PHYS 132</td>
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<td>4 cr</td>
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<tr>
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<td>CHEM 152</td>
<td>Introduction to Chemistry II</td>
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<td>CHEM 201</td>
<td>Organic Chemistry I</td>
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<td>CHEM 202</td>
<td>Organic Chemistry II</td>
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<td>Biology Electives (300 level or above)</td>
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<td>OR MATH 220</td>
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<tr>
<td>OR MATH 232</td>
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</table>

**TOTAL PRE-PROFESSIONAL CONCENTRATION REQUIREMENTS**  

62 cr
MCLA-NEW YORK COLLEGE OF PODIATRIC MEDICINE
ARTICULATION PROGRAM

This agreement allows MCLA students with a pre-professional concentration to simultaneously complete their senior year of undergraduate study and their first year of podiatric medicine at the New York College of Podiatric Medicine (NYCPM). MCLA will count credits from NYCPM toward a B.S. in biology. Students must meet admission requirements of NYCPM and fulfill departmental and articulation agreement requirements to be eligible for this program. Please contact the Biology Department for more information.

CONCENTRATION IN PRE-PHYSICAL THERAPY

The Biology Department’s pre-physical therapy concentration provides the science background required for most doctoral programs in physical therapy.

PRE-PHYSICAL THERAPY CONCENTRATION

Requirements

<table>
<thead>
<tr>
<th>Course</th>
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<td>150 Introduction to Biology</td>
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<td>BIOL</td>
<td>240 Genetics</td>
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<tr>
<td>BIOL</td>
<td>245 Zoology</td>
<td>4 cr</td>
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<tr>
<td>BIOL</td>
<td>330 Seminar</td>
<td>1 cr</td>
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<tr>
<td>BIOL</td>
<td>342 Anatomy &amp; Physiology I</td>
<td>4 cr</td>
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<td>BIOL</td>
<td>343 Anatomy &amp; Physiology II</td>
<td>4 cr</td>
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<tr>
<td>BIOL</td>
<td>440 Physiological Aspects of Exercise</td>
<td>4 cr</td>
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Upper Level Biology Electives: 3 cr

CHEM 150 & 152 General Chemistry I & II: 8 cr

CHEM 201 & 202 Organic Chemistry I & II: 8 cr

MATH 232 Introduction to Statistics: 3 cr

PHYS 131 & 132 General Physics I & II: 8 cr
PSYC   100  Introduction to Psychology     3 cr
PSYC   210  Developmental Psychology     3 cr

TOTAL PRE-PHYSICAL THERAPY CONCENTRATION REQUIREMENTS                       62 cr

MCLA-SAGE COLLEGE ARTICULATION PROGRAM IN PRE
PHYSICAL THERAPY
Students must acquire an overall GPA of 3.25 and a minimum science GPA of 3.25. Students must also complete 40 hours of clinical observation with a physical therapist. In addition, an articulation agreement with The Sage Colleges in Albany, N.Y., ensures that students who meet admission requirements at Sage and fulfill departmental and articulation requirements at MCLA will receive preferential acceptance into the Doctor of Physical Therapy program at The Sage Colleges. Please contact Dr. Anne Goodwin for more information about this program.

MCLA-SAGE COLLEGE ARTICULATION PROGRAM IN
OCCUPATIONAL THERAPY
This agreement allows MCLA students to continue their studies in occupational therapy at The Sage Colleges in Albany, N.Y. Students must meet admission requirements at The Sage Colleges and fulfill departmental and articulation requirements at MCLA. Please contact Dr. Anne Goodwin for more information about this program. Students must acquire a minimum overall GPA of 3.25 in their undergraduate program and in the following specified courses.

BIOL   150  Introduction to Biology     4 cr
BIOL   342  Anatomy & Physiology I     4 cr
BIOL   343  Anatomy & Physiology II     4 cr
CONCENTRATION IN MEDICAL TECHNOLOGY
The Department of Biology offers a four-year program in medical technology. Students spend their first three years on the MCLA campus obtaining a liberal arts education with a broad background in science, thereby providing the education necessary for professional responsibilities. The fourth year of the program consists of coursework in an accredited hospital with a school of medical technology. During the hospital coursework, students receive clinical laboratory training. Hospitals and adjunct faculty affiliated with MCLA are as follows:

BERKSHIRE MEDICAL CENTER, PITTSFIELD
Lori Moore, B.S., MT (ASCP) Educational Coordinator;
Jessica Krochmal, MD, Medical Director

MEDICAL TECHNOLOGY CONCENTRATION
Requirements
BIOL 101 Biology Seminar for Entering Majors 1 cr
<table>
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<th>Course Code</th>
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<tr>
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<tr>
<td>BIOL 240</td>
<td>Genetics</td>
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<td>BIOL 245</td>
<td>Zoology</td>
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<td>BIOL 305</td>
<td>Immunology</td>
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<tr>
<td>BIOL 320</td>
<td>Microbiology</td>
<td>4 cr</td>
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<tr>
<td>BIOL 342</td>
<td>Anatomy &amp; Physiology I</td>
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<tr>
<td>BIOL 343</td>
<td>Anatomy &amp; Physiology II</td>
<td>4 cr</td>
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<tr>
<td>BIOL 491</td>
<td>BMC: Clinical Chemistry</td>
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<td>BIOL 492</td>
<td>BMC: Clinical Molecular Biology</td>
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<tr>
<td>BIOL 493</td>
<td>BMC: Clinical Immunology</td>
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<tr>
<td>BIOL 494</td>
<td>BMC: Clinical Hematology</td>
<td>8 cr</td>
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<tr>
<td>BIOL 495</td>
<td>BMC: Clinical Urinalysis &amp; Body Fluid</td>
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<tr>
<td>BIOL 496</td>
<td>BMC: Clinical Microbiology</td>
<td>8 cr</td>
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<tr>
<td>BIOL 497</td>
<td>BMC: Clinical Immunohematology</td>
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<td>CHEM 150</td>
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<td>CHEM 202</td>
<td>Organic Chemistry II</td>
<td>4 cr</td>
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<tr>
<td>OR BIOL 360</td>
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<tr>
<td>MATH 232</td>
<td>Introduction to Statistics</td>
<td>3 cr</td>
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**TOTAL MEDICAL TECHNOLOGY CONCENTRATION REQUIREMENTS**  82 - 83 cr

**CONCENTRATION IN BIOTECHNOLOGY**
The Department of Biology offers a four-year program in biotechnology. The Biology Department’s biotechnology concentration provides students with a strong background in both biology and chemistry. This concentration has a strong emphasis on laboratory coursework, which prepares students for a
wide range of careers in the field of biotechnology. Students are strongly encouraged to gain experience through undergraduate research and/or internships.

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<td>BIOL 245</td>
<td>Zoology</td>
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<tr>
<td>BIOL 320</td>
<td>Microbiology</td>
<td>4 cr</td>
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<tr>
<td>BIOL 330</td>
<td>Biology Seminar</td>
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<tr>
<td>BIOL 360</td>
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<td>3 cr</td>
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<tr>
<td>BIOL 390</td>
<td>Biometry</td>
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<td>BIOL 410</td>
<td>Biotechniques</td>
<td>4 cr</td>
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<tr>
<td>BIOL 480</td>
<td>Cell Biology</td>
<td>4 cr</td>
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<tr>
<td>CHEM 150</td>
<td>Introduction to Chemistry I</td>
<td>4 cr</td>
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<tr>
<td>CHEM 152</td>
<td>Introduction to Chemistry II</td>
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<td>CHEM 201</td>
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<td>PHYS 131</td>
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<td>PHYS 132</td>
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<td>MATH 150</td>
<td>Pre-Calculus</td>
<td>3 cr</td>
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<tr>
<td>OR MATH 232</td>
<td>Intro to Statistics</td>
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<tr>
<td>OR MATH 220</td>
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<tr>
<td>CSCI 243</td>
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<tr>
<td>BIOL 420</td>
<td>Bioinformatics</td>
<td>3 cr</td>
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**TOTAL BIOTECHNOLOGY CONCENTRATION REQUIREMENTS** 69 cr
MCLA – BERKSHIRE COMMUNITY COLLEGE BIOTECHNOLOGY
ARTICULATION AGREEMENT
This program is a 2 + 2 program with Berkshire Community College, which allows students who complete BCC’s liberal arts biotechnology concentration to transfer seamlessly into MCLA’s Biology Major with a concentration in biotechnology.

BCC Program-Specific Courses 26 cr
BCC General Education Courses 36 cr
*MCLA Program-Specific Courses 42 cr
*MCLA Graduation Req 17 cr
Tier III 3 cr
Additional Upper Level Reqs 12 cr
Physical Education Req 2 cr
BIOL 101 Seminar 1 cr
BIOL 240 Genetics 4 cr
BIOL 245 Zoology 4 cr
BIOL 320 Microbiology 4 cr
BIOL 330 Seminar 1 cr
BIOL 360 Biochemistry 3 cr
BIOL 390 Biometry 3 cr
BIOL 410 Biotechniques 4 cr
BIOL 420 Bioinformatics 3 cr
BIOL 480 Cell Biology 4 cr
CSCI 243 Database Development 3 cr
PHYS 131 General Physics I 4 cr
PHYS 132 General Physics II 4 cr

TOTAL MCLA – BERKSHIRE COMMUNITY COLLEGE
BIOTECHNOLOGY ARTICULATION AGREEMENT REQUIREMENTS 121 cr
CONCENTRATION IN ALLIED HEALTH
The Biology Department’s Allied Health Concentration provides the science background required for the most post-baccalaureate programs in allied health professions such as physician assistant, nurse practitioner, registered nurse, and nutritionist.

BIOL 101 Biology Seminar for Majors 1 cr  
BIOL 150 Introduction to Biology 4 cr  
BIOL 235 Botany  
OR BIOL 245 Zoology 4 cr  
BIOL 240 Genetics 4 cr  
BIOL 250 Nutrition 3 cr  
BIOL 320 Microbiology 4 cr  
BIOL 330 Biology Seminar 1 cr  
BIOL 342 Anatomy & Physiology I 4 cr  
BIOL 343 Anatomy & Physiology II 4 cr  
BIOL 480 Cell Biology 4 cr  
BIOL upper level elective 3 cr  
CHEM 150 & 152 General Chemistry I & II 8 cr  
CHEM 201 & 202 Organic Chemistry I & II 8 cr  
PHYS 131 & 132 General Physics I & II 8 cr  
MATH 232 Introduction to Statistics 3 cr  

TOTAL ALLIED HEALTH CONCENTRATION REQUIREMENTS 63 cr

In addition, an articulation agreement with the The Sage Colleges in Albany, NY ensures that the students who meet admission requirements at Sage and fulfill department and articulation requirements at MCLA will be accepted into the Master’s of Science in Applied Nutrition program at The Sage Colleges.
BIOLOGY MINOR PROGRAM

Requirements

BIOL 100 Concepts in Biology
Or BIOL 150 Introduction to Biology        4 cr
Choose one of the following:          4 cr
BIOL 235 Botany
BIOL 240 Genetics
BIOL 245 Zoology
Biology electives   12 cr
(One elective must be at 300 level or above, remaining electives at the 200 level or above)

TOTAL BIOLOGY MINOR REQUIREMENTS                       20 cr

TEACHING LICENSURE

Students majoring in biology may opt to pursue initial teacher licensure as an early childhood teacher or elementary teacher. Also, biology majors may pursue initial licensure as a teacher of biology for the middle school or secondary levels. Students seeking any of these licensures must complete a biology major, education major and a licensure program in education.

BIOLOGY AWARDS

Awards will be given annually to graduating seniors who have demonstrated outstanding performance in course work as well as in independent research. Students recommended for this award must meet the following criteria:

- A minimum overall GPA of 3.20
- A minimum GPA of 3.50 in courses counting towards the biology major
- Above average achievement at least one semester of independent research. Result of the research project must be presented at the College’s Undergraduate Research Conference.
• A minimum of 16 BIOL credit hours taken at MCLA (not counting independent research credit hours)

COURSE DESCRIPTIONS

BIOL 100        Concepts in Biology 4 cr
Provides the non-major knowledge of basic biological concepts. Concepts in Biology deals with the development of concepts in the biological science of life. Among the areas to be studied are evolution, genetics, and developmental biology: all deal with the fundamental characteristic of life: its ability to replicate over time. Required laboratory. Course attributes: CSTL.
Prerequisite: None

BIOL 101        Biology Seminar for Majors 1 cr
Introduces students to biology in order to support majors in their academic work. Explores the diversity of fields within biology through presentations, reading and writing activities and interactions with peers and mentors. This seminar is required for all MCLA biology majors.
Prerequisite: Biology major

BIOL 105        Human Biology 3 cr
Provides students with the knowledge about the structure and function of the human body. Students will develop ability to critically evaluate a large number of issues in this field, as presented in scientific publications and the news media. Students will gain a foundation essential for making knowledgeable decisions regarding quality of life. Students will be encouraged to share experiences based on their own culture and gender. Course attributes: CST.
Prerequisite: None
BIOL 150  Introduction to Biology  4 cr  
Introduces the student to cell biology, mitosis, meiosis, genetics, photosynthesis, respiration and cellular organisms. This course is designed for, but not limited to, students pursuing a major/minor in science. Required laboratory. Course attributes: CSTL, ENVI.  
Prerequisite: None

BIOL 195  Topics in Biology  1 to 4 cr  
Provides students with an opportunity to explore different topics and current issues in biology or related fields within the Department. This course is designed to focus on special biological topics or issues at an introductory level.  
Prerequisite: None

BIOL 235  Botany  4 cr  
Overview of the fundamental principles of plant biology with emphasis on anatomy, taxonomy, physiology and evolution of algae, non-vascular and vascular plants, including major divisions of gymnosperms and angiosperms. The focus will be on plants of economic, cultural or ecological significance. Required laboratory. Course attributes: ENVI.  
Prerequisite: BIOL 100 or BIOL 150

BIOL 240  Genetics  4 cr  
Examines the major aspects of heredity, with emphasis on Mendelian principles as well as multiple genes, linkage, sex chromosomes, chromosome numbers, and biochemical and population genetics. Required laboratory.  
Prerequisite: BIOL 150

BIOL 245  Zoology  4 cr  
Introduces the student to the biology of the invertebrate and vertebrate animals of the world through evolutionary and phylogenetic relationships. The course
serves as an introduction to the major phyla. Required laboratory. Course attributes: ENVI.

**Prerequisite:** BIOL150 or equivalent

**BIOL 250 Nutrition** 3 cr
Investigates the importance of diet for present and future good health. Examines the importance of carbohydrates, fats, proteins, vitamins and minerals, and their interactions. In addition, the course explores topics such as label-reading, diets, dietary analysis and other issues of current interest.

**Prerequisite:** BIOL100 or BIOL150

**BIOL 255 Biodiversity** 4 cr
Focuses on global, regional and local patterns of biological diversity and the processes that influence these patterns. Central to discussions of biodiversity pattern and process will be the relevant scientific principles from ecology, evolution and conservation biology. The impact of humans on natural systems and biodiversity loss will also be discussed. Specific case studies will be used to illustrate biodiversity loss and proposals to protect and restore biodiversity. Required laboratory. Course attributes: CSTL.

**Prerequisite:** None

**BIOL 295 Topics in Biology** 1 to 4 cr
Provides students with an opportunity to explore different topics and current issues in biology or related fields within the Department. This course is designed to focus on special biological topics or issues at a sophomore level.

**Prerequisite:** BIOL 150 or department approval

**BIOL 305 Immunology** 3 cr
Examines the structure and function of antigens, antibodies and the cellular system of immunity. Additional topics include a study of the complement
system, antibody classification, and immunological tolerance. The interaction of all systems will be emphasized.

**Prerequisite:** BIOL 240

**BIOL 307  Pharmacology  3 cr**
Examines the basic principles of pharmacology. Focuses on prescription and non-prescription drugs, their use, actions, indications, contraindications, misuse and abuse. Drugs will be considered on a body system basis with the appropriate consideration of the application of pharmacological principles as applied to specific body systems. Emphasis is on pharmacological applications to athletic training. Stresses the use of electronic media in both learning exercises and as a source of drug information.

**Prerequisite:** BIOL 150, CHEM 150

**BIOL 310  Animal Physiology  4 cr**
Explores man and other vertebrates, in regard to the structure and function of the basic tissue types and the major organ systems with major emphasis on normal functions and the interactions of each organ system to insure homeostasis. Required laboratory.

**Prerequisite:** BIOL 150

**BIOL 316  Functional Human Anatomy  3 cr**
Studies human anatomy as it pertains to human motion, with respect to anatomical and musculoskeletal fundamentals. Includes a review of anatomy with emphasis on the function of joints and muscles as they relate to normal human movement.

**Prerequisite:** BIOL 100 or BIOL 150
BIOL 317    Advanced Genetics               3 cr
Studies selected topics in the field of genetics. Emphasizes the genetic
mechanism as well as how this enables us to understand how genetics fits into
the growing field of biology as well as its impact upon society.
Prerequisite: BIOL 240

BIOL 318    Parasitology                   4 cr
Introduces students to the principles of parasitology and the related health
concerns to humans and animals. Parasites from the following categories will
be covered: protozoa, platyhelminthes, nematoda and arthropoda. Required
laboratory.
Prerequisite: BIOL 245

BIOL 320    Microbiology                   4 cr
Investigates prokaryotic and viral microbes with emphasis on both general and
clinical applications. Major topics covered are taxonomy, anatomy,
morphology, reproduction and growth, bacterial control, pathogenicity,
genetics and genetic engineering. Extensive laboratory protocol is provided.
Required laboratory. Course attributes: ENVI.
Prerequisite: BIOL 240

BIOL 324    Marine Biology                 3 cr
Explores the factors that limit the abundance and distribution of marine
organisms. Topics include the diversity of habitats, reproductive strategies and
the interrelationships between organisms, as well as the influence of currents,
light, temperature and nutrient supply on the abundance and distribution of
life in the oceans. Course attributes: ENVI.
Prerequisite: BIOL 235, BIOL 245 or permission of instructor
BIOL 327  Plants and Society  3 cr
Introduces students to the interactions between people and plants in cultures throughout the world. Topics to be discussed include the current and historical use of plants as food, fiber, fuel and medicine. Course attributes: ENVI.
Prerequisite: None

BIOL 327H  Honors: Plants and Society  3 cr
Introduces students to the interactions between people and plants in cultures throughout the world. Topics to be discussed include the current and historical use of plants as food, fiber, fuel and medicine. Course attributes: ENVI, HONR.
Prerequisite: None

BIOL 330  Biology Seminar  1 cr
Utilizes a format of individual reports and/or group discussions of current papers, topics, or problems in the biological sciences. One hour weekly.
Prerequisite: Junior/senior Biology majors

BIOL 331  Animal Behavior  4 cr
Introduces the topic of animal behavior, exploring the principles of ecology, evolution, development, and ethology. The course will examine behavioral adaptation (including physiological, ecological, and evolutionary aspects) from individuals to population-level interactions. Topics include: foraging, anti-predator, and mating strategies: mechanistic control of behavior, sociality, and aggression. Laboratory component will focus on observation, communication, and experimental design.
Prerequisite: BIOL 240
BIOL 340  Developmental Biology 4 cr
Investigates the development of plants and animals at the cellular, tissue and organismal level. Topics include gametogenesis, fertilization, early development, organogenesis and the control of these processes. Required laboratory.
Prerequisite: BIOL 240

BIOL 341  Conservation Biology 3 cr
Introduces the preservation of biodiversity at all levels: genetic, population, community, ecosystem and biosphere. Topics will include population biology, extinction, wildlife and land-use management, and socioeconomic factors involved in conservation decision making. Course attributes: ENVI.
Prerequisite: BIOL 100 or BIOL 150 or ENVI 150 or ENVI 150H

BIOL 342  Anatomy and Physiology I 4 cr
Explores structure and function of the organ systems of the human body, with emphasis on the integumentary, skeletal, muscular, nervous and endocrine systems. The required laboratory includes histology, gross anatomy and physiology exercises. Required laboratory.
Prerequisite: BIOL 150

BIOL 343  Anatomy and Physiology II 4 cr
Explores structure and function of the organ systems of the human body, with emphasis on the respiratory, cardiovascular, immune, renal and reproductive systems. The required laboratory includes histology, gross anatomy and physiology exercises. Required laboratory.
Prerequisite: BIOL 150, BIOL 342
BIOL 351  Ornithology  
Provides an overview of the fundamental principles of avian biology with emphasis on ecological and behavioral aspects of ornithology. Students will learn to identify about 100 regional species by sight and/or sound. A semester long project will encourage students to investigate and read the ornithological peer-reviewed scientific literature. Lab activities will include field trips to practice identifying birds and collecting avian field data. Required laboratory. Course attributes: ENVI.
Prerequisite: BIOL 100 or BIOL 150 or ENVI 150 or ENVI 150H or instructor permission

BIOL 360  Biochemistry  
Surveys the structure and properties of biologically important compounds: carbohydrates, proteins, amino acids, lipids, nucleic acids, and vitamins. Other topics to be covered include enzyme activity, cellular metabolism and protein synthesis.
Prerequisite: CHEM 201

BIOL 361  Advanced Biochemistry  
Studies the chemical dynamics in living systems. Topics include enzymes mechanisms, metabolism and its regulation, and energy production and utilization.
Prerequisite: BIOL 360

BIOL 371  Forest Environment  
Provides the student a background and introduction to the forest ecosystem. The temperate forest of the Northeast will exemplify the principles discussed. Required laboratory. Course attributes: ENVI.
Prerequisite: Junior status
BIOL 375  Aquatic Ecology  4 cr
Focuses on the physical, chemical, and biological environment of freshwater systems, as well as on common methods used in the study of these systems. Concepts will be applied to addressing current challenges in conserving freshwater resources. Required laboratory.
Prerequisite: BIOL 100 or BIOL 150 or ENVI 150H or instructor approval

BIOL 380  Evolution  3 cr
Examines the history of evolutionary thought and the processes of organic evolution. Students will present selected topics to the class. Guest speakers will present the effects of Darwinian thinking in such disciplines as philosophy, anthropology, psychology, sociology and religion.
Prerequisite: Junior status and/or department approval

BIOL 390  Biometry  3 cr
Application-oriented introduction to data analysis in the context of biology. Students will learn to statistically analyze and interpret data collected from a variety of biological experiments.
Prerequisite: Junior status and MATH 150, or MATH 220, or MATH 232

BIOL 395  Special Topics in Biology  1 to 4 cr
A course or seminar for students who have taken a substantial number of biology courses. This course may explore any of a variety of topics.
Prerequisite: Junior/senior status, department approval

BIOL 410  Biotechniques  4 cr
Explores major techniques in the fields of biochemistry, cellular biology and molecular biology. This course is designed to be completely laboratory based.
Prerequisite: BIOL 240, BIOL 245
BIOL 420  Bioinformatics  3 cr
Introduces the fundamental algorithms used in bioinformatics and how these algorithms can be used to solve biological problems. In this class, the students will learn how bioinformatics algorithms work, as well as how to obtain sequence data from scientific databases and analyze these data using tools available on a high-performance computer.
Prerequisite: CSCI 243, BIOL 240

BIOL 424  Field Study in Marine Biology  4 cr
Students will conduct research studies in marine habitats. Field work will take place in the Bahamas over spring break. Students will have the opportunity to visit a variety of habitats, such as sandy intertidal zones, estuaries, mangrove forests, shallow benthic areas and coral reefs (barrier, fringing and patch). Students will plan studies, conduct research at the field station, prepare a research report and present their findings.
Prerequisite: BIOL 324, instructor approval

BIOL 440  Physiological Aspects of Exercise  4 cr
Develops an understanding of the phenomena involved in optimum physiological functioning during work performance, whether it be in everyday living or athletic participation. Provides students with an understanding of the physiological aspects of exercise and its practical applications. Required laboratory.
Prerequisite: BIOL 150

BIOL 460  Ecology  4 cr
Investigates community and ecosystem structure and function, energy transformation, matter cycling, abiotic factors, food webs, symbiosis and populations. Required laboratory. Course attributes: ENVI.
Prerequisite: BIOL 245
BIOL 480     Cell Biology     4 cr
Explores the eukaryotic and prokaryotic cell. Examines the cellular processes of transport phenomena, membrane metabolism, growth, and reproduction, with detailed coverage of the ultrastructure and function of cellular organelles. Laboratory emphasizes development of investigative techniques and genetic engineering. Required laboratory.
Prerequisite: Junior/senior status

BIOL 484     Biomechanical Analysis of Human Movement     3 cr
Provides instruction in those competencies essential to the study of the human body as a machine for the performance of work. Enables effective understanding and/or evaluation of motor skills and their effect on the human structure.
Prerequisite: BIOL 316

BIOL 491     BMC: Clinical Chemistry     8 cr
Introduces the student to the physiology of the organ system of the body and the various analytes that interact with them. Discusses abnormal physiology and relates to various disease states. Discusses the principles of test methodology. The student applies this theory to the clinical lab using current diagnostic techniques and instrumentation to correlate lab results to disease processes.
Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med Tech Clinical Lab Experience

BIOL 492     BMC: Clinical Molecular Biology     1 cr
Introduces the student to the basic structure and function of DNA. Discusses the impact of molecular genetics in medicine and specific methods for analysis. The student applies this theory in the molecular biology laboratory using
current diagnostic techniques and instrumentation to correlate lab results with disease.

**Prerequisite:** Department approval, requires acceptance and enrollment in MCLA-BMC Med. Tech. Clinical Lab Experience

**BIOL 493 BMC: Clinical Immunology** 1 cr
Introduces the student to the immune system and the immune response. Discusses immune detection, immunodeficiency disorders, autoimmune diseases, hypersensitivity, and tumor and transplant immunology. Discusses the antigen-antibody complex and the relationship to current testing methodology. The student applies this theory in the clinical lab using current immunologic techniques and instrumentation to correlate lab results to disease processes.

**Prerequisite:** Department approval, requires acceptance and enrollment in MCLA-BMC Med. Tech. Clinical Lab Experience

**BIOL 494 BMC: Clinical Hematology** 8 cr
Introduces students to the study of the hematopoietic system including the relationship of hematologic diseases to diagnostic characteristics. Discusses erythrocyte and leukocyte disorders; cellular morphology, mechanisms and disorders of hemostasis and fibrinolysis; and principles of test methodology. The student applies this theory in the clinical lab using current diagnostic techniques and instrumentation to correlate lab results to disease processes.

**Prerequisite:** Department approval, requires acceptance and enrollment in MCLA-BMC Med. Tech. Clinical Lab Experience

**BIOL 495 BMC: Clinical Urinalysis and Body Fluids** 1 cr
Introduces the student to the study of body fluids including urine, cerebral spinal fluid, synovial fluid, serous fluids, seminal fluid and miscellaneous other fluids. Discusses specimen collection and analysis. The student applies this
theory in the clinical lab using current diagnostic techniques and instrumentation to correlate lab results with disease processes.

**Prerequisite:** Department approval, requires acceptance and enrollment in MCLA-BMC Med. Tech. Clinical Lab Experience

**BIOL 496 BMC: Clinical Microbiology 8 cr**
Introduces the student to the study of bacterial, fungal, parasitic and viral infections in humans. Discusses transmission, clinical symptoms, specimen collection and laboratory methods used to identify suspect organisms. Discusses prevention, as well as antibiotic therapy. The student applies this theory in the clinical lab to isolate and identify pathogens, to provide antibiotic sensitivity information, and to correlate culture results with disease states.

**Prerequisite:** Department approval, requires acceptance and enrollment in MCLA-BMC Med. Tech. Clinical Lab Experience

**BIOL 497 BMC: Clinical Immunohematology 5 cr**
Introduces the student to the different human blood groups, blood components, the antibody screening and identification process, transfusion protocols, blood donor screening, and state and federal regulations. The student applies this theory in the clinical lab to process blood and its components, determine blood product compatibility, apply appropriate quality control and correlate patient results to blood disorders.

**Prerequisite:** Department approval, requires acceptance and enrollment in MCLA-BMC Med. Tech. Clinical Lab Experience

**BIOL 499 Teaching Assistant in Biology 1 to 3 cr**
Provides the opportunity for a student to assist in the preparation and implementation of a biology course.

**Prerequisite:** Department approval
BIOL 500  Biology Independent Study 1 to 3 cr
Open to juniors and seniors who wish to read in a given area or to study a topic in depth. Written reports and frequent conferences with the advisor are required.
**Prerequisite:** Junior/senior status, department approval

BIOL 510  Biology Independent Research 1 to 3 cr
For biology majors who desire to conduct research on a specific topic in biology. The research will be under the direction of the instructor and will require a scholarly report.
**Prerequisite:** Department approval

BIOL 540  Biology Internship 1 to 15 cr
Offers the student an opportunity to practice in a professional situation relevant to the biology major. The student will work with a faculty sponsor and an off-campus supervisor, as appropriate.
**Prerequisite:** Department approval, junior/senior status

BIOL 590  Medical Technology/Cytotechnology Internship 15 to 16 cr
A specialized internship for this concentration taken during the fourth year of the program in an accredited hospital with a medical technology or cytotechnology program. During the internship students receive clinical laboratory training.
**Prerequisite:** Department approval, senior status