

BIOLOGY

(413) 662-5153

www.mcla.edu/biol (<http://www.mcla.edu/biol/>)

Chairperson: Justin Golub, Ph.D.

Email: J.Golub@mcla.edu

Biology General Major

The general biology major provides students with a strong background in the biological sciences, from molecules to organisms to ecological relationships. Advanced courses build upon information learned in the foundational courses and allow students to pursue their own areas of interest. The general major is a good choice for students interested in Botany, Wildlife Biology, Conservation Biology, Marine Biology, and Secondary Education. A major in traditional Biology prepares students to pursue graduate degrees or to work in a variety of settings.

Students graduating with a major in Biology 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.

MCLA-New York College of Podiatric Medicine Articulation Program

Strong students that have met the requirements outlined in the articulation agreement can simultaneously complete their senior year of undergraduate study and the first year of podiatric medicine at the New York College of Podiatric Medicine. MCLA counts credits from the New York College of Podiatric Medicine toward the B. S. in Biology.

Biology Achievement Award

This award recognizes the achievement of a student in their junior year (at least 1 full semester of classwork remaining) of the Biology Major. Factors for consideration are GPA, course and department involvement (independent research, TA, SI, etc.), and extracurricular activities.

Transfer of Anatomy and Physiology Coursework

Biology, Health Science, Radiologic Technology, Public Health and Community Health transfer students who completed Anatomy & Physiology I and II from an institution with a course number less than 300 will be required to take *either* BIOL 343 Anatomy and Physiology II, or BIOL 404 Research Methods in Human Physiology.

Biology Programs

- Biology - Pre-Medical Professions Concentration, B.S. (<https://catalog.mcla.edu/undergraduate/academic-programs-study/biology/biology-pre-medical-professions-concentration-bs/>)
- Biology - Pre-Veterinary Concentration, B.S. (<https://catalog.mcla.edu/undergraduate/academic-programs-study/biology/biology-pre-veterinary-concentration-bs/>)

- Biology Minor (<https://catalog.mcla.edu/undergraduate/academic-programs-study/biology/biology-minor/>)
- Biology, B.S. (<https://catalog.mcla.edu/undergraduate/academic-programs-study/biology/biology-bs/>)

Biology Courses

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.

Corequisite: BIOL 100L

Attributes: Core Science & Tech w/lab (CSTL)

BIOL 101 Biology Seminar for Majors

1 cr

Introduces students to scientific skills that will support majors in their academic work. Explores the diversity of biological and health fields through presentations, scientific literature and communication activities, and interactions with peers and mentors. This seminar is required for students majoring in biology, health sciences and community health education.

Prerequisite: BIOL or HLTH or CHLT Major

BIOL 102 Nutrition for Healthy Living with Lab

4 cr

Introduces the non-major to the importance of diet for present and future good health. Examines the importance of carbohydrates, fats, proteins, vitamins and minerals, and their interactions. Explores topics such as label-reading, popular diets, dietary analysis, and other issues of current interest in the field of nutrition. Students may take either BIOL 102 (4 credit lab course) or BIOL 103 (3 credit non-lab course) but not both.

Corequisite: BIOL 102L

Attributes: Core Science & Tech w/lab (CSTL)

BIOL 103 Nutrition for Healthy Living

3 cr

Introduces the non-major to the importance of diet for present and future good health. Examines the importance of carbohydrates, fats, proteins, vitamins and minerals, and their interactions. Explores topics such as label-reading, popular diets, dietary analysis, and other issues of current interest in the field of nutrition. Students may take either BIOL 102 (4 credit lab course) or BIOL 103 (3 credit non-lab course) but not both.

Attributes: Core Science & Tech w/o lab (CST)

BIOL 104 Evolution of Sex

3 cr

Explores sex as a biological phenomenon, from understanding its role in propagation and evolution. Topics will include reproductive structures, mechanisms of sex, and the development of sexual traits, and behaviors. We discuss sex across the diversity of living organisms; from bacteria to fungi, plants, and animals; and touch on a variety of sexual paradigms.

Attributes: Core Science & Tech w/o lab (CST)

BIOL 105 Human Biology

3 cr

Provides the non-major 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.

Attributes: Core Science & Tech w/o lab (CST)

BIOL 150 Introduction to Biology I: Cells

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.

Corequisite: BIOL 150L

Attributes: Core Science & Tech w/lab (CSTL), Environmental Studies (ENVI)

BIOL 160 Introduction to Biology II: Organisms

Introduces the student to evolution, ecology, and diversity of life. This course is designed for, but not limited to, students pursuing a major/minor in science.

Prerequisite: BIOL 100 or BIOL 150 or ENVI 150H

Corequisite: BIOL 160L

BIOL 195 Special Topics in Biology

Provides students with an opportunity to explore different topics and current issues in the field of biology. This course is designed to focus on biological issues at the introductory level.

Repeatable: Unlimited Credits

BIOL 235 Botany

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.

Prerequisite: BIOL 100 or BIOL 150

Corequisite: BIOL 235L

Attributes: Environmental Studies (ENVI)

BIOL 240 Genetics

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.

Prerequisite: BIOL 150

Corequisite: BIOL 240L

BIOL 245 Zoology

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.

Prerequisite: BIOL 150

Corequisite: BIOL 245L

Attributes: Environmental Studies (ENVI)

BIOL 250 Nutrition

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: BIOL 100 or BIOL 150

BIOL 255 Biodiversity

Provides the non-major with focus on global, regional and local patterns of biological diversity and processes that influence these patterns. Central to discussions of biodiversity pattern and process will be scientific principles from ecology, evolution and conservation biology. The impact of humans on natural systems and biodiversity loss will also be discussed. Case studies will be used to illustrate biodiversity loss and proposals to protect and restore biodiversity.

Corequisite: BIOL 255L

BIOL 295 Special Topics in Biology

Provides students with an opportunity to explore different topics and current issues in the field of biology. This course is designed to focus on biological issues at the high introductory level.

Prerequisite: Will vary depending on the course

Repeatable: Unlimited Credits

BIOL 302 Applied Statistics in Biology

Utilizes a format of mini-lectures and group discussions of statistical analyses used in biology and health fields. One hour weekly.

Prerequisite: MATH 232 and sophomore status

BIOL 305 Immunology

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

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 309 Neurobiology

Provides knowledge of the basic concepts and mechanisms of neurons and the nervous systems. Topics discussed include the central nervous system, neuron structure, impulses, synaptic transmission, neurotransmitters, sensory systems, and motor pathways, with emphasis on vision. The complexities and latest ideas on consciousness, wiring, development and learning, and memory systems will be explored in literature.

Prerequisite: BIOL 100 or BIOL 150

BIOL 312 Epidemiology

Introduces the student to the field of epidemiology. Students will learn about the distribution, frequency, and determinants of patterns of disease and health conditions in various human populations.

Prerequisite: MATH 232 and BIOL 150 or HLTH 150 or HLTH 150H

BIOL 316 Functional Human Anatomy

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

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 320 Microbiology 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. Prerequisite: BIOL 240 Corequisite: BIOL 320L Attributes: Environmental Studies (ENVI)	4 cr	BIOL 334 Field Botany Provides skills in plant identification through extensive fieldwork and study of live and pressed specimens. Emphasis on use of keys and associated terminology, exposure to the major vascular plant groups of northeastern North America, and practice identifying unknown plants. Students will learn about identification, morphology, ecology, taxonomy, and nomenclature of large taxonomic groups such as Poaceae (grasses) and Asteraceae (aster family). Required laboratory; labs mostly outdoors. Prerequisite: BIOL 160 or BIOL 235 Corequisite: BIOL 334L	4 cr
BIOL 324 Marine Biology 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. Prerequisite: BIOL 160 Attributes: Environmental Studies (ENVI)	3 cr	BIOL 339 Developmental Biology 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. This course integrates lecture and laboratory experiences. Credit will be granted for either BIOL 339 or BIOL 340 but not both. Prerequisite: BIOL 240	3 cr
BIOL 327 Plants and Society 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. Prerequisite: Sophomore/junior/senior status Attributes: Environmental Studies (ENVI)	3 cr	BIOL 340 Developmental Biology with Lab 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. Credit will be granted for either BIOL 339 or BIOL 340 but not both. Prerequisite: BIOL 240 Corequisite: BIOL 340L	4 cr
BIOL 327H Honors: Plants and Society 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. Prerequisite: Sophomore/junior/senior status Attributes: Environmental Studies (ENVI), Honors Program (HONR)	3 cr	BIOL 341 Conservation Biology 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. Prerequisite: BIOL 160 or ENVI 150 or ENVI 150H Attributes: Environmental Studies (ENVI)	3 cr
BIOL 330 Journal Article Discussion Utilizes a format of individual presentations and group discussions of journal articles related to topics in biology or health. One hour weekly. Prerequisite: junior/senior status Repeatable: Maximum of 12 credits	1 cr	BIOL 342 Anatomy and Physiology I 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. Prerequisite: BIOL 150 Corequisite: BIOL 342L	4 cr
BIOL 332 Bryology & Lichenology Provides skills in identification and knowledge of taxonomy, biology and ecology of bryophytes (mosses, liverworts, hornworts) and macrolichens, with focus on the taxa found in northeastern North America. Students will gain experience identifying these groups using hand-lenses and microscopes, dissections, and chemical testing, and will learn techniques for preparing a personal reference collection and specimens for museum-vouchered collections. Required laboratory; labs mostly outdoors. Prerequisite: BIOL 160 or BIOL 235 Corequisite: BIOL 332L	4 cr	BIOL 343 Anatomy and Physiology II 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. Prerequisite: BIOL 150, BIOL 342 Corequisite: BIOL 343L	4 cr
BIOL 332H Honors: Bryology and Lichenology Provides skills in identification and knowledge of taxonomy, biology and ecology of bryophytes (mosses, liverworts, hornworts) and macrolichens, with focus on the taxa found in northeastern North America. Students will gain experience identifying these groups using hand-lenses and microscopes, dissections, and chemical testing, and will learn techniques for preparing a personal reference collection and specimens for museum-vouchered collections. Required laboratory; lab mostly outdoors. Prerequisite: BIOL 160 or BIOL 235 Corequisite: BIOL 332LH Attributes: Honors Program (HONR)	4 cr	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. Prerequisite: BIOL 100 or BIOL 150 or ENVI 150 or ENVI 150H Corequisite: BIOL 351L Attributes: Environmental Studies (ENVI)	4 cr

BIOL 353 Entomology 4 cr Prepares students to confidently key specimens of New England insects and other relevant taxa to the family, genus or species level. Students will gain extensive practice in examining insects and other relevant invertebrates using hand-lenses and microscopes, as well as identifying live and preserve specimens using dichotomous keys and associated terminology. Students will learn techniques for assembling a personal reference collection and preparing specimens for museum-vouchered collections. Prerequisite: BIOL 160 Corequisite: BIOL 353L	BIOL 390 Biostatistics 3 cr Application-oriented examination of data analysis and experimental design in the context of biology. Students will learn to statistically analyze and interpret data collected from a variety of biological and health related experiments. Prerequisite: MATH 150, or MATH 220, or MATH 232
BIOL 354 Ecology 4 cr Investigates community and ecosystem structure and function, energy transformation, matter cycling, abiotic factors, food webs, symbiosis and populations. Prerequisite: BIOL 160 or ENVI 150 or ENVI 150H Corequisite: BIOL 354L	BIOL 395 Special Topics in Biology 1-4 cr Provides students with an opportunity to explore different topics and current issues in the field of biology. This course is designed to focus on biological issues at the advanced level. Prerequisite: Will vary depending on the course Repeatable: Unlimited Credits
BIOL 355 Environmental Microbiology 4 cr Provides a solid foundation in core areas of environmental microbiology and microbial evolution & ecology. The course covers topics including microbial phylogenetic classification, physiological characterization, environmental detection & quantification, basic microbial ecology & evolution, and microbiological characterization of natural environments (soil, animal hosts, etc.). The laboratory will focus on skills and techniques in environmental microbiology and microbial ecology. Required Laboratory. Corequisite: BIOL 355L	BIOL 403 Advanced Nutrition 3 cr Explores current issues, topics and research strategies that apply to nutrition, with focus on primary literature in the field. Course topics may include athletic performance, human disease, nutritional therapy and/or community nutrition. Prerequisite: BIOL 250, junior/senior status
BIOL 360 Biochemistry 3 cr 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 404 Research in Human Physiology 3 cr Allows the student to practice research methods in human physiology and to design, conduct and present the findings of a research study in human physiology. Prerequisite: BIOL 343 Anatomy & Physiology II or TRBI 252 Anatomy & Physiology II
BIOL 361 Advanced Biochemistry 3 cr Studies the chemical dynamics in living systems. Topics include enzymes mechanisms, metabolism and its regulation, and energy production and utilization. Prerequisite: BIOL 360	BIOL 405 Animal Physiology 4 cr Explores structure and function of major animal organ systems, addressing mechanisms for maintaining homeostasis and body functions. Both vertebrate and invertebrate examples will be used, and experimentation and primary literature will be emphasized. Prerequisite: BIOL 160, junior/senior status Corequisite: BIOL 405L
BIOL 361H Honors: Advanced Biochemistry 3 cr Studies the chemical dynamics in living systems. Topics include enzymes mechanisms, metabolism and its regulation, and energy production and utilization. Prerequisite: BIOL 360 Attributes: Honors Program (HONR)	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 160, BIOL 240, junior/senior 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. Prerequisite: BIOL 100 or BIOL 150 or ENVI 150H Corequisite: BIOL 375L	BIOL 412 Research Methods in Epidemiology 3 cr Introduces the student to research methods in the field of epidemiology. Students will learn the value of research methodology as applied to the field of epidemiology with a focus on concepts and interpretation of basic research design and statistical analysis. Prerequisite: BIOL 312 and junior/senior status
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: BIOL 240	BIOL 417 Parasitology 3 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. This course integrates lecture and laboratory experiences. Credit will be granted for either BIOL 417 or BIOL 418 but not both. Prerequisite: BIOL 150 or BIOL 160 and junior/status BIOL 418 Parasitology with Lab 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. Credit will be granted for either BIOL 417 or 418 but not both. Prerequisite: BIOL 150 or BIOL 160 and junior/senior status Corequisite: BIOL 418L

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, junior/senior status	BIOL 484 Biomechanics 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 or BIOL 342 and junior/senior status
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, and junior/senior status Attributes: Additional Fees Apply (FEE)	BIOL 491 BMC: Clinical Chemistry 8 cr Introduces the student to the physiology of the organ systems 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 440 Exercise Physiology 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. Prerequisite: BIOL 343 and junior/senior status Corequisite: BIOL 440L	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. Tech. Clinical Lab Experience. Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med
BIOL 445 Pathophysiology 3 cr Provides an in-depth survey of physiological causes and pathological development of diseases that affect various organ systems in the body. Pathologies will be examined at the molecular, cellular, tissue and organ levels, with emphasis on the homeostatic disturbances that lead to disease conditions. Current research insights relating to disease states will be addressed throughout the course. Prerequisite: BIOL 343	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. Tech. Clinical Lab Experience. Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med
BIOL 450 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 160, BIOL 240, junior/senior status Corequisite: BIOL 450L	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. Tech. Clinical Lab Experience. Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med
BIOL 475 Special Topics in Biology 1-4 cr Provides students with an opportunity to explore different topics and current issues in the field of biology. This course is designed to focus on biological issues at the high advanced level. Prerequisite: Will vary depending on the course Repeatable: Unlimited Credits	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. Tech. Clinical Lab Experience. Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med
BIOL 480 Cell & Molecular Biology 4 cr Examines the pioneering research in eukaryotic cell and molecular biology. Topics covered include structure and function of organelles, membrane dynamics, intracellular targeting, metabolism, eukaryotic replication, transcription, and translation, and applications to biotechnology. The required laboratory component emphasizes current cell and molecular techniques. Prerequisite: BIOL 240 and junior/senior status Corequisite: BIOL 480L	

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. Tech. Clinical Lab Experience.

Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med

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. Tech. Clinical Lab Experience.

Prerequisite: Department approval, requires acceptance and enrollment in MCLA-BMC Med

BIOL 499 Teaching Assistant in Biology 1-3 cr

Provides the opportunity for a student to assist in the preparation and implementation of a biology course.

Prerequisite: Department approval

Repeatable: Maximum of 6 credits

BIOL 500 Biology Independent Study 1-3 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

Repeatable: Maximum of 12 credits

BIOL 510 Biology Independent Research 1-3 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

Repeatable: Maximum of 15 credits

BIOL 540 Biology Internship 1-15 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

Repeatable: Maximum of 15 credits

BIOLOGY: TEACHER LICENSURE

Students majoring in Biology may opt to pursue initial licensure as an early childhood teacher, or elementary teacher. Also, Biology majors may pursue initial licensure as a teacher of Biology at the secondary level. These students will complete a Biology major and a licensure program in Education. Please see the Education major for more details.