BIOLOGY (BIOL)

BIOL 101 GENERAL BIOLOGY I3 Credits
A survey of cellular principles, including biological chemistry, cell structures and function, cellular metabolism (including photosynthesis), genetic expression, cell division, and an introduction to multicellularity and cell signaling.
Co-requisites: BIOL 101L

BIOL 101L GENERAL BIOLOGY I LABORATORY1 Credit
Laboratory experience to explore cellular principles to integrate with BIOL 101, including scientific inquiry and data analysis skills to investigate biological chemistry, cell structure and function, cellular metabolism, genetic expression, and cell division. Scientific inquiry, microscopic image analysis, and use of manipulative, observational, and case study learning will be utilized.
Co-requisites: BIOL 101

BIOL 102 GENERAL BIOLOGY II3 Credits
Exploration of the diversity and origin of life, classification of living organisms and their interrelatedness, and ecology. Major topics include evolution, speciation, classification, morphology, reproduction, structure and function, and ecology.
Co-requisites: BIOL 102L

BIOL 102L GENERAL BIOLOGY II LABORATORY1 Credit
Laboratory experience in major animal, plant, fungal, and other eukaryotic groups along with their morphology, phylogeny, ecology, and importance. Most activities will involve microscope use, observations, drawings, and identification..
Co-requisites: BIOL 102

BIOL 121 HUMAN BIOLOGY2 Credits
An introductory study of the structure and processes of the human body.
Co-requisites: BIOL 121L
Notes: Not for Biology or Health Science majors and minors.

BIOL 121L HUMAN BIOLOGY LABORATORY1 Credit
Laboratory experience in the structure and processes of the human body.
Co-requisites: BIOL 121

BIOL 132 MEDICAL TERMINOLOGY2 Credits
The study of prefixes, suffixes and roots of words used in medical and biological fields, emphasizing their origin in the Greek and Latin languages.
Notes: Designed for biology majors and pre-professional students in the health care fields; this course does not satisfy any essential studies requirements.

BIOL 136 BIOLOGICAL SCIENCE2 Credits
A survey of biological sciences, including scientific inquiry processes, basic biological chemistry, cells, metabolic processes, genetic expression and inheritance, cell division, and diversity and phylogenetic relationships of life. Designed to meet the needs of non-science majors.
Co-requisites: BIOL 136L
Notes: No credit towards biology major or minor.

BIOL 136L BIOLOGICAL SCIENCE LABORATORY1 Credit
Laboratory experience in biological study, to complement the course topics in BIOL 136. Scientific inquiry, microscopic image analysis, and use of manipulative, observational, and case study learning will be utilized.
Co-requisites: BIOL 136

BIOL 200 INDEPENDENT STUDY OR RESEARCH1-3 Credits
Study or research in an area of special interest under the direction of a biology faculty member.
Add Consent: Department Consent
Notes: The number of credit hours is determined by the topic and the amount of work required.
Requirements: Approval of instructor and appropriate academic administrators required.

BIOL 230 HISTOLOGY2 Credits
Students will explore general tissue characteristics, while examining their composition, structures and the structure-function relationship in different tissues and organs. This course is designed for students who are planning on continuing on to professional school.
Prerequisites: BIOL 101 and BIOL 101L

BIOL 237 ENVIRONMENTAL SCIENCE3 Credits
A survey of basic principles and unifying concepts of Environmental Science, based on major themes of modern environmental sciences: humans and sustainability; science and ecological principles; sustaining biodiversity and natural resources; and sustaining environmental quality and human societies.

BIOL 240 ANATOMY AND PHYSIOLOGY I3 Credits
The anatomy and physiology of the human body will be studied through the ten body systems. The content of this course includes the microscopic organization of the tissues of the body and the integument, skeletal, muscular, nervous systems.
Prerequisites: BIOL 101, 101L and either CHEM 131 and 131L or CHEM 140 and 140L
Co-requisites: BIOL 240L
Notes: This is the first semester of a two semester sequence with BIOL 242 Anatomy and Physiology II; this course is designed for students preparing for 2 year health professional schools.

BIOL 240L ANATOMY AND PHYSIOLOGY I LABORATORY1 Credit
Laboratory experience in human Anatomy and Physiology I. The content of this course includes the microscopic organization of tissues of the body, anatomy and physiology of the integument, skeletal, muscular and nervous systems. For the anatomy portion, donor bodies are used.
Co-requisites: BIOL 240

BIOL 241 MICROBIOLOGY3 Credits
A survey of microorganisms - including ecological and metabolic integration relating to microbial growth and survival, genetics of prokaryotes and viruses, phylogenetic diversity of eukaryotic microorganisms, and an introduction to immunology and infectious diseases.
Prerequisites: BIOL 101, 101L
Co-requisites: BIOL 241L

BIOL 241L MICROBIOLOGY LABORATORY1 Credit
Laboratory inquiry experience in a survey of microorganisms - including techniques for isolating and studying bacteria, genetic modification of bacteria, eukaryote and pathogen identification, white blood cell differentials, and antimicrobial sensitivity.
Co-requisites: BIOL 241

BIOL 242 ANATOMY AND PHYSIOLOGY II3 Credits
The anatomy and physiology of the human body will be studied through the ten body systems. The content of this course includes the microscopic organization of the tissues of the endocrine, cardiovascular, lymphatic, respiratory, urinary, digestive, and reproductive systems.
Prerequisites: BIOL 240 and 240L
Co-requisites: BIOL 242L
Notes: This is the second semester of a two semester sequence with BIOL 240 Anatomy and Physiology I; this course is designed for students preparing for the 2 year health professional schools.

BIOL 242L ANATOMY AND PHYSIOLOGY II LABORATORY1 Credit
Laboratory experience in human Anatomy and Physiology II. The content of this course includes anatomy and physiology of the endocrine, cardiovascular, lymphatic, digestive, urinary, males and female reproductive systems. For the anatomy portion, donor bodies are used.
Co-requisites: BIOL 242

BIOL 243 BOTANY3 Credits
A survey of the plant kingdom, with a focus on flowering plants. Phylogeny, anatomy, cellular and organismal physiology, and plant importance to humans and role in climate moderation and responses to climate change will be studied.
Prerequisites: BIOL 101, 101L, 102, and 102L
Co-requisites: BIOL 243L
Notes: The class and the laboratory provide complementary, non-overlapping content with a common grade assigned for both class and lab.

BIOL 243L BOTANY LABORATORY1 Credit
Laboratory inquiry experience in a survey of the plant kingdom, with a focus on flowering plants. Phylogeny, anatomy, cellular and organismal physiology, and plant importance to humans and role in climate moderation and responses to climate change will be studied.
Co-requisites: BIOL 243

BIOL 244 ZOOLOGY3 Credits
The physiology, behavior, ecology, and phylogenetic treatment of vertebrate and invertebrate animals, living and extinct. Primary literature reading and technical writing are required in this course.
Prerequisites: BIOL 101, 101L, 102, 102L
Co-requisites: BIOL 244L

BIOL 244L ZOOLOGY LABORATORY1 Credit
Laboratory experience in the phylogenetic relationships of animals, including identification of major groups and their characteristics and exploration of structure and function during dissections.
Prerequisites: BIOL 101, 101L, 102, 102L
Co-requisites: BIOL 244

BIOL 270 TOPICS IN BIOLOGY1-3 Credits
Special topics appropriate for lower division credit.
Notes: May be repeated with different emphasis for up to six hours credit.

BIOL 312 BIOLOGY FOR EDUCATORS3 Credits
This course will examine basic principles in cell biology, genetics, anatomy and physiology, microbiology, and ecology with the aim of learning how to teach these subjects in a high school classroom. Lesson planning, activity development, scientific literacy, critical thinking skills, active learning, inquiry-based learning and brain-based learning will be incorporated.
Prerequisites: BIOL 101, 101L, 102, 102L
Co-requisites: BIOL 312L

BIOL 312L BIOLOGY FOR EDUCATORS LABORATORY1 Credit
This laboratory course will utilize scientific inquiry, data collection and analysis, interpretation, and scientific report writing while investigating principles of cellular biology, genetics, anatomy and physiology, microbiology, and ecology in a laboratory setting. Students will be required to purchase laboratory supplies.
Prerequisites: Sophomore or above status
Co-requisites: BIOL 312

BIOL 315 REGIONAL ANATOMY1 Credit
Regional anatomy of the human body will be studied. The purpose of this course is to be an accompaniment to the BIOL 340: Anatomy Cadaver lab experience.
Prerequisites: BIOL242 and 242L or equivalent
Co-requisites: BIOL 340L
Add Consent: Instructor Consent
Requirements: Students must have previously taken a 200 level Anatomy (anatomy/physiology) course to a 300 level anatomy course. Instructor approval required.

BIOL 316 PHYSIOLOGY OF THE HUMAN SYSTEMS1 Credit
Physiology of the systems of the human body will be studied. The purpose of this course is to be an accompaniment to the BIOL 342L Human Physiology Lab.
Prerequisites: BIOL 242 and 242L or equivalent
Co-requisites: BIOL 342L
Add Consent: Instructor Consent
Requirements: Students must have previously taken a 200 level physiology (anatomy/physiology) course or a 300 level physiology course. Instructor approval required.

BIOL 320 SUPERVISED STUDY IN LAB AND FIELD METHODS1-2 Credits
Students will prepare, supervise, and evaluate laboratory exercises under the direction of faculty members. Designed to give students practical experience teaching in the laboratory setting.
Cross-Listed: BIOL/CHEM/GEOS/PHYS320
Prerequisites: Sophomore or above status

BIOL 323 BASIC HEMATOLOGY1 Credit
Basic hematology and urinalysis including microscope usage and care; blood cell formation, function and destruction; abnormal blood cells; blood clotting; coagulation disorders; and the chemical and physical examination of urine.
Prerequisites: Either BIOL 240 and 240L or BIOL 340 and 340L and either CHEM 131 and 131L or CHEM 140 and 140L
Co-requisites: BIOL 323L

BIOL 323L BASIC HEMATOLOGY LABORATORY1 Credit
Laboratory experience in basic hematology and urinalysis.
Co-requisites: BIOL 323
Requirements: All students must have received two of the three hepatitis B vaccinations prior to beginning this course.

BIOL 327 ENVIRONMENTAL REMEDIATION2 Credits
This course covers the physical, chemical, and biological methods of environmental remediation, including biochemical mechanisms behind biodegradation, biotransformation, uptake, and detoxification of metals and organic pollutants.
Prerequisites: BIOL 101, 101L, 102, 102L, 241, 241L, and CHEM 231, 231L or CHEM 333, 333L and sophomore or above status
Co-requisites: BIOL 327L

BIOL 327L ENVIRONMENTAL REMEDIATION LABORATORY1 Credit
Laboratory experience in experimental design and applied usage of chemical and biological techniques for environmental remediation.
Co-requisites: BIOL 327

BIOL 332 GENETICS3 Credits
Transmission of traits from generation to generation, including Mendelian, molecular, and population genetics. Study of biotechnology and genomics and their uses in laboratory studies, medicine, agriculture, law enforcement, and personal disease predisposition will be included.
Prerequisites: BIOL 101, 101L and either CHEM 131 and 131L or CHEM 140 and 140L, and completion of Essential Studies SLO#4
Co-requisites: BIOL 332L

BIOL 332L GENETICS LABORATORY1 Credit
Laboratory experience in inheritance, molecular genetic analysis, and genomic studies, including the use of biotechnology to detect or alter genetic sequences.
Co-requisites: BIOL 332

BIOL 333 HUMAN DISEASES IN THE RURAL ENVIRONMENT3 Credits
An introduction to the causes and spread of human diseases within populations and factors associated with distribution, including cellular/physiological, biological, behavior, sociocultural, evolutionary, and environmental factors. Using epidemiological and biological terminology and methods, critical thinking and basic analysis, students will be able to describe how diseases distribute through a populations and communities, as well as interpret and evaluate epidemiological and physiological studies. The U.S. and global view of epidemiology will also be discussed with an emphasis on the rural/urban divide in disease spread and health care access.
Prerequisites: Sophomore or above status

BIOL 336 GENERAL ECOLOGY2 Credits
The structure and function of nature with emphasis on biomes, ecosystems, communities, and populations.
Prerequisites: 6 credits from BIOL 101, BIOL 101L, BIOL 102, BIOL 102L, AGRI 141, AGRI 242 or AGRI 242L
Co-requisites: BIOL 336L

BIOL 336L GENERAL ECOLOGY LABORATORY1 Credit
Laboratory experience in describing and quantifying organismal populations. Field techniques, data collection, and data interpretation are embedded within this laboratory experience.
Co-requisites: BIOL 336

BIOL 337 ENVIRONMENTAL MANAGEMENT3 Credits
Ecosystem management, environmental planning, history of environmental protection, the roles of federal and state agencies, environmental law, environmental ethics, and professional skills relevant to those interested in land-management related careers in the public and private sector.
Prerequisites: 9 credits from AGRI, BIOL, CHEM and/or GEOS

BIOL 339 COMPARATIVE ANATOMY AND PHYSIOLOGY3 Credits
A systemic approach to vertebrate anatomy and physiology examining how structures and organ systems have evolved through the different vertebrate groups from fish to mammals. The structure and function of vertebrate organ systems will be discussed in the context of developmental and evolutionary history.
Prerequisites: 6 credits from AGRI, BIOL, CHEM, GEOS, and/or PHYS
Co-requisites: BIOL 339L

BIOL 339L COMPARATIVE ANATOMY AND PHYSIOLOGY LABORATORY1 Credit
Investigation of vertebrate anatomy and physiology through dissection of a variety of vertebrates and microscopic examination of selected histological preparations of tissues.
Co-requisites: BIOL 339

BIOL 340 HUMAN ANATOMY3 Credits
An advanced study of the microscopic and gross structure of the human body. This course will prepare the student for entry into BIOL 342. Donor bodies are used.
Prerequisites: Either BIOL 101, 101L and BIOL 102, 102L or BIOL 242, 242L, and either CHEM 131, 131L, or CHEM 140, 140L
Co-requisites: BIOL 340L

BIOL 340L GROSS HUMAN ANATOMY LABORATORY1 Credit
Gross human anatomy laboratory uses donor bodies.
Co-requisites: BIOL 340

BIOL 342 HUMAN PHYSIOLOGY3 Credits
The detailed human physiology of each organ system of the body is discussed at an advanced level. BioPac computer laboratory equipment and donor bodies are used.
Prerequisites: BIOL 340 and 340L
Co-requisites: BIOL 342L
Notes: This is the second semester of a two semester sequence with BIOL 340; this course is designed for students preparing for 3-4 year professional schools.

BIOL 342L HUMAN PHYSIOLOGY LABORATORY1 Credit
Laboratory experience in physiology of human systems, using technology and donor bodies.
Co-requisites: BIOL 342

BIOL 343 PARASITOLOGY2 Credits
Taxonomy, morphology, physiology, life history, and control of the parasitic protozoans, helminthes, and arthropods. Primary literature reading and technical writing are required in this course.
Prerequisites: BIOL 244 and 244L
Co-requisites: BIOL 343L

BIOL 343L PARASITOLOGY LABORATORY1 Credit
Laboratory experience in identifying and understanding parasites of living systems.
Co-requisites: BIOL 343

BIOL 347 CRYPTOGAMIC BOTANY2 Credits
Phylogeny and ecology of bacteria, algae and fungi.
Prerequisites: BIOL 243 and 243L or 9 hours from AGRI courses
Co-requisites: BIOL 347L

BIOL 347L CRYPTOGAMIC BOTANY LABORATORY1 Credit
Laboratory survey of bacteria, algae and fungi.
Co-requisites: BIOL 347

BIOL 350 FIELD BIOLOGY1-6 Credits
One- to five- week field course offered between semesters, spring break, or during the summer.
Prerequisites: Sophomore or above status
Notes: One hour of credit may be earned for each week of full time participation; itinerary for each class will be announced several weeks prior to registration.
Requirements: Fees in addition to tuition will be charged; early registration required.

BIOL 390 INTERNSHIP IN BIOLOGY1-12 Credits
Provides practical experience as a biologist in government, business, or industry. Open to upper division students majoring in the area of biology.
Add Consent: Department Consent
Notes: Interested students should contact the Internship and Career Services office to secure application materials; application should be made prior to the semester the internship will be started; the amount of credit will be based on the availability of a suitable work position, the qualifications of the applicant, and the work hours.

BIOL 400 INDEPENDENT STUDY OR RESEARCH1-3 Credits
Study or research in an area of special interest under direction of a biology faculty member.
Add Consent: Instructor Consent
Notes: The number of credit hours is determined by the topic and the amount of work required.
Requirements: Approval of instructor and designated academic administrators required.

BIOL 401 ORNITHOLOGY2 Credits
Biology of birds, including their classification, anatomy, physiology, life history, behavior, ecology, and identification with emphasis on local species.
Prerequisites: BIOL 244 and 244L or 9 credits of AGRI courses
Co-requisites: BIOL 401L

BIOL 401L ORNITHOLOGY LABORATORY1 Credit
Laboratory and field experience in anatomy, behavior, and identification of birds. Field trips and a field notebook project is required.
Co-requisites: BIOL 401

BIOL 405 HUMAN ANATOMY MENTOR2 Credits
Students will assist BIOL 340L, Gross Anatomy Lab instructor in the preparation and delivery of laboratory instruction using anatomical specimens, and conduct additional optional "open-lab' study sessions.
Prerequisites: BIOL 342 and 342L
Co-requisites: BIOL 422
Add Consent: Instructor Consent
Requirements: Written permission of instructor is required.

BIOL 406 HUMAN PHYSIOLOGY MENTOR2 Credits
Students will assist BIOL 342L, Human Physiology Lab instructor in the preparation and delivery of laboratory instruction using live physiologic experimentation and computer simulations and conduct additional optional "open-lab" study sessions.
Prerequisites: BIOL 422
Co-requisites: BIOL 424
Add Consent: Instructor Consent
Requirements: Written permission of instructor is required.

BIOL 409 SENIOR BIOLOGY RESEARCH1-3 Credits
Original investigation in biology under a biology faculty member's supervision and guidance. A public presentation of results will occur.
Add Consent: Instructor Consent
Notes: May be repeated up to four times, for no more than 6 credits total.

BIOL 422 ADVANCED HUMAN ANATOMY1 Credit
The advanced study of human anatomy through human gross dissection, histological analysis and clinical anatomy of each system of the body.
Prerequisites: BIOL 340 and 340L
Co-requisites: BIOL 405
Add Consent: Instructor Consent
Requirements: Written permission by the course instructor required.

BIOL 424 ADVANCED PHYSIOLOGY1 Credit
The advanced study of human physiology through a group research project monitoring physiological processes in human subjects for the duration of the semester, class discussions of primary and secondary literature relevant to the group project, and writing assignments designed to help students with their end of semester project reports. Appropriate channels for the ethical use of human subjects will be followed within the guidelines for Chadron State College.
Prerequisites: BIOL 342 and BIOL 342L
Co-requisites: BIOL 406
Add Consent: Instructor Consent
Requirements: Written permission by the course instructor required

BIOL 427 BIOLOGY OF POPULATIONS3 Credits
Population ecology and the genetic processes of adaptation and evolution. Lectures and class discussion of current literature, plus application of concepts in a literature review paper is required. Technical writing is utilized in this course.
Prerequisites: BIOL 332 and 332L or 9 credits of AGRI, and Essential Studies #4 completed

BIOL 428 BIOINFORMATICS3 Credits
Introduction to the use of bioinformatics data and methods to study DNA and protein sequences and evaluate differences in gene expression between cells. Methods taught in this class are useful for studies in biotechnology, genetics, nutrition, molecular biology, microbiology, epidemiology, pharmacology, and ecology. Students will learn to use available information and databases to ask complex biological questions using a project-based approach.
Prerequisites: BIOL 332, 332L and MATH 232

BIOL 430 IMMUNOLOGY3 Credits
Function of the human immune system including the structure and function of bone marrow, blood cells, and lymphatic tissue.
Prerequisites: BIOL 241 and 241L

BIOL 431 ENTOMOLOGY2 Credits
Taxonomy, morphology, physiology, life history, behavior, ecology and economic importance of insects. Lecture, laboratory and field trips. Primary literature reading and technical writing are required in this course.
Prerequisites: 6 credits of BIOL and/or AGRI
Co-requisites: BIOL 431L

BIOL 431L ENTOMOLOGY LABORATORY1 Credit
Laboratory and field experience in insect morphology and taxonomy. Activities include collecting, identifying, and preparing insect specimens following standard methods, with discussion about conservation. Emphasis on order and family recognition is included. A student insect project is required.
Co-requisites: BIOL 431

BIOL 432 DEVELOPMENTAL BIOLOGY2 Credits
Molecular and cellular aspects of development, including the regulation and expression of the genome during development, fertilization, cleavage, gastrulation, morphogenesis, and organogenesis.
Prerequisites: BIOL 332, 332L, 340, 340L and either CHEM 131, 131L or CHEM 140, 140L
Co-requisites: BIOL 432L

BIOL 432L DEVELOPMENTAL BIOL LABORATORY1 Credit
Laboratory experience in vertebrate embryology and morphological development.
Co-requisites: BIOL 432

BIOL 433 HUMAN BIOMECHANICS2 Credits
Utilization of anatomy, physiology, biochemistry, and physics in the study of human movement, with emphasis on biomechanics, control and integration of muscle groups in maintaining posture and producing complicated movements, bioenergetics, adaptation of the body to stress and exercise, and training regimens.
Prerequisites: PHYS 151, 151L, and either BIOL 240, 241L or BIOL 340, 340L, and either CHEM 131, 131L or CHEM 140, 140L
Co-requisites: BIOL 433L

BIOL 433L HUMAN BIOMECHANICS LAB1 Credit
Laboratory experience in human movement. Technology and donor bodies will be used.
Co-requisites: BIOL 433

BIOL 435 MAMMALOGY2 Credits
Systematics, life history, physiology, and behavior of mammals.
Cross-Listed: AGRI445/BIOL435
Prerequisites: BIOL 244 and 244L or 9 credits of AGRI
Co-requisites: AGRI 445L or BIOL 435L

BIOL 435L MAMMALOGY LABORATORY1 Credit
Laboratory experience in mammal structure and function.
Cross-Listed: AGRI445L/BIOL435L
Co-requisites: AGRI 445 or BIOL 435

BIOL 438 TAXONOMY OF PLANTS2 Credits
Applied taxonomy of vascular plants, with emphasis on families of flowering plants in the northern Great Plains.
Prerequisites: BIOL 243 and 243L or AGRI 141 or AGRI 339 and 339L
Co-requisites: BIOL 438L
Requirements: Field trips required.

BIOL 438L TAXONOMY OF PLANTS LABORATORY1 Credit
Laboratory experience in collecting, identifying and preparing vascular plant specimens, with emphasis on family recognition. A student plant collection project is required.
Co-requisites: BIOL 438

BIOL 439 PLANT PHYSIOLOGY2 Credits
Physiological and developmental processes occurring in cells, tissues, and organs of plants, with emphasis on hormonal, environmental and other control mechanisms of plant processes and development.
Prerequisites: BIOL 243 and 243L or AGRI 141 or AGRI 339 and 339L and either CHEM 131 and 131L or CHEM 140 and 140L
Co-requisites: BIOL 439L

BIOL 439L PLANT PHYSIOLOGY LABORATORY1 Credit
Laboratory experience in plant structure and function, with an emphasis on applied plant biochemistry. Data collection and interpretation with technical writing is required.
Co-requisites: BIOL 439

BIOL 440 TOPICS IN BIOLOGY1-3 Credits
Designed to meet the needs of students desiring knowledge in areas of biology not covered in another biology course. Study topics and credit will be arranged to meet the needs of the students. Laboratory work and field work.
Notes: Can be repeated with a change in emphasis for a total of six hours of credit.
Requirements: Extra fees may be required.

BIOL 444 FRESHWATER ECOLOGY2 Credits
Biological, chemical, and physical studies of inland surface waters. Includes both classic Limnology and Ichthyology. Primary literature reading and technical writing are required in this course.
Prerequisites: BIOL 102 and 102L and either CHEM 131 and 131L or CHEM 140 and 140L or 9 credits of AGRI
Co-requisites: BIOL 444L
Requirements: Field trips required.

BIOL 444L FRESHWATER ECOLOGY LABORATORY1 Credit
Laboratory and field experience in biological, chemical, and physical studies of inland surface waters. Includes both classic Limnology and Ichthyology. Field trips required.
Co-requisites: BIOL 444

BIOL 446 REGIONAL FLORA3 Credits
The plants and plant communities of the region. Field trips required.
Prerequisites: BIOL 243 and 243L or instructor consent

BIOL 447 PLANT PHYLOGENY1 Credit
The phylogenetic treatment of green plants, living and extinct.
Prerequisites: BIOL 243 and 243L or 9 credits of AGRI
Co-requisites: BIOL 447L

BIOL 447L PLANT PHYLOGENY LABORATORY2 Credits
Survey of green plant groups, with emphasis on the taxonomy and ecology of bryophytes.
Co-requisites: BIOL 447

BIOL 448 ETHNOBOTANY3 Credits
Plants useful or harmful to man, their origins and history, botanical relationships, chemical constituents which make them economically important, roles in prehistoric and modern cultures and civilizations, and the potential of the plant kingdom for new economically important species. This course does not require prior knowledge of plant science.

BIOL 449 MOLECULAR BIOLOGY OF THE CELL3 Credits
In-depth analysis of eukaryotic cellular biology, including mechanisms of DNA repair and recombination, regulation of gene expression, co- and post-translational protein modification and intracellular trafficking, signal transduction, and cell cycle regulation. An emphasis is placed on evaluation of primary literature, molecular techniques, and data analytics.
Prerequisites: BIOL 241, 241L, 332, 332L

BIOL 452 MAMMALIAN ANATOMY AND PHYSIOLOGY3 Credits
Systematic investigation into mammalian anatomy and physiology, through investigating the phylogenetic diversity across mammalians orders. Structure and function of organ systems from developmental and historical evolutionary viewpoints will be examined.
Prerequisites: BIOL 244, 244L, and either CHEM 131, 131L or CHEM 140, 140L

BIOL 453 ENVIRONMENTAL REMEDIATION AND TOXICOLOGY3 Credits
This course covers the physical, chemical, and biological methods for environmental remediation. An emphasis is on toxicology and bioremediation, including mechanisms behind biodegradation, biotransformation, uptake, and detoxification of heavy metals and organic pollutants, with incorporation of related cased studies.
Prerequisites: BIOL 241, 241, CHEM 132, 132L
Notes: This course will replace BIOL 327/327L Environmental Remediation and Lab, when approved.

BIOL 456 PATHOGENIC MICROBIOLOGY2 Credits
Major communicable diseases of humans caused by bacteria, fungi, and viruses. Global and regional impact, host-parasite relationships, morphology and physiology, diagnostic techniques used in isolation and identification, treatment, prevention, and modes of transmission are discussed.
Prerequisites: BIOL 102, 102L, 241, 241L

BIOL 456L PATHOGENIC MICROBIOLOGY LABORATORY1 Credit
Laboratory experience in isolation and clinical identification of pathogenic microbes.
Co-requisites: BIOL 456

BIOL 458 BIOLOGICAL EVOLUTION3 Credits
Study of the fundamental theory of evolution, including phylogeny and earth history, macro-evolutionary patterns, micro-evolutionary processes, and application, using popular and scientific literature in discussions. Primary literature reading and technical writing are required for this course.
Prerequisites: BIOL 332 and 332L or GEOS 234 and 234L or GEOS 337 and 337L

BIOL 478 PRACTICUM IN HEALTH SCIENCES: RADIOLOGIC TECHNOLOGY1 Credit
Provides supervised application of clinical skills and theories. Students will demonstrate skills including, but not limited to radiographic positioning, patient care, and radiation safety. Students are expected to function within the health care environment building professional communication skills and outstanding customer service. An increasing amount of independence is expected from the student as they progress through the clinical course. This course may be repeated. Each semester will teach different clinical skills with increasing expectations.
Notes: Will support Health Sciences: Radiologic Technology option
Requirements: 30 CSC hours and junior status; acceptance into an approved radiologic technology program.

BIOL 479 PRACTICUM IN HEALTH SCIENCES: RESPIRATORY THERAPY5 Credits
A combination of clinical and coursework building towards a career in respiratory therapy. The clinical portion of this course will include clinical rotations with a wide range of patient populations. Students are evaluated on affective skills, as well as clinical competencies. Course work will include principles of respiratory therapy throughout the internship year. The student will demonstrate competencies in a respiratory lab setting. Students must make arrangements to conduct clinicals in an approved hospital setting. May be repeated 3 times.
Add Consent: Instructor Consent
Requirements: Completion of 30 CSC credits; acceptance into an approved radiologic technology program; instructor consent.

BIOL 499 BIOLOGY CAPSTONE3 Credits
Students will integrate information from their undergraduate biology program to select a topic, which must be approved by the biology faculty. Students will examine the scientific research supporting the thesis, the broad shift in ideas and knowledge relating to the topic and its interaction with society, and political and ethical considerations relating to the subject. Students will find appropriate primary research articles to support the thesis and will complete original research paper or literature review (senior thesis) on the topic, a public presentation, and a poster. This course is a technical writing-intensive course.
Prerequisites: Either BIOL 332 and 332L or BIOL 342 and 342L
Notes: Course is intended for biology majors in their final year of their undergraduate program.