**DEPARTMENT OF BIOLOGY**

College of Natural and Social Sciences

Julie Shaffer, Ph.D., Chair - (308) 865-8661
Paul Twigg, Ph.D., Graduate Program Committee Chair - (308) 865-8315
Letty Reichart, Ph.D., Director of Biology Distance (Non-thesis) Program - (308) 865-8568
Brian Peterson, M.S., Coordinator Biology Distance (Non-thesis) Program - (308) 865-1589
msbiology@unk.edu

Biology is part of the Master of Science in Education Degree in Science/Math Education (http://catalog.unk.edu/graduate/departments/science-math-education-program).

**Master of Science**

- Biology (http://catalog.unk.edu/graduate/departments/biology/biology-ms) - Master of Science Degree (thesis and non-thesis)

**Graduate Faculty**

Professor: Kimberly Carlson, Keith Geluso, Julie Shaffer, Janet Steele, Paul Twigg
Associate Professor: Marc Albrecht, Nathaniel Bickford, Brad Ericson, Thomas Freeman, Letitia Reichart, Dawn Simon
Assistant Professor: Surabhi Chandra, Bryan Drew, Brandon Luedtke

**Graduate Program Committee**

Twigg (Chair), Bickford, Chandra, Freeman, Luedtke, Simon

**Biology (BIOL)**

**BIOL 801 – Principles of Immunology 3 credit hours**
An in-depth discussion of the principles of modern immunology. Major topics of discussion will include: cellular components of the immune system; antibody structure, function and synthesis; function of cytokines and complement; MHC structure and function; and the immune system and disease. A competent background in cell biology and/or biochemistry and microbiology is strongly recommended. Offered online, Spring of even-numbered years.

**BIOL 801P – Principles of Immunology 4 credit hours**
Topics to be covered include: 1) the structural and functional aspects of the immune system, 2) disorders of the immune system, 3) structure and function of antibody molecules, 4) immuno-biology of tissue transplants, 5) basic aspects of cancer and cancer therapy that relate to immunology, 6) allergies, and 7) antigen-antibody interaction. Lab required. Offered on-campus Fall only.
Prerequisite: BIOL 309 and BIOL 360 and BIOL 211 or BIOL 400
Additional Course Fee Required

**BIOL 802 – Organic Evolution 3 credit hours**
This course is an overview of the basic concepts in evolutionary biology with a focus on pattern and process through the use of examples. Molecular and organismal data will be examined. Offered online, every Fall and Spring.

**BIOL 803P – Plant Physiology 3 credit hours**
Life processes of plants with an emphasis on water relations and hormonal and stress physiology. Three hours of laboratory each week. Offered online, Fall of even-numbered years and on-campus on demand. Additional Course Fee Required

**BIOL 804 – Evolution of Epidemics 3 credit hours**
Through videotaped lectures, reading and writing assignments, and online discussions, students will develop an understanding of the origin and the evolution of plagues. We will illustrate the techniques humans have to defend against epidemics and will speculate about their role in shaping humanity and our futures. Offered online, Spring of odd-numbered years.

**BIOL 804P – Developmental Biology 3 credit hours**
Principles of developmental processes with emphasis on the physiological and genetic events occurring during the growth and maturation of living organisms. Three hours of laboratory each week. Offered on-campus, Spring of even-numbered years.
Additional Course Fee Required

**BIOL 805P – Range and Wildlife Management 3 credit hours**
Basic principles of range and pasture management for use by domestic livestock and wildlife. Course includes three hours of field or laboratory work each week. Offered on-campus, Spring of even-numbered years.
Additional Course Fee Required

**BIOL 806P – Plant Ecology 3 credit hours**
A study of plants in relation to their environment. Three hours of laboratory or field work each week. Offered online and on campus Fall of even-numbered years.
Additional Course Fee Required

**BIOL 809P – Biological Studies using GIS 3 credit hours**
The principles needed to use GIS software. Student will also learn about online data sources, GPS receivers, and organizing data structures on computers for projects. Independent projects will be required to allow students to get that crucial experience. Offered online, Fall of even-numbered years.
Prerequisite: BIOL 307 and General Biology I II

**BIOL 810P – Fire Ecology and Management in Grasslands 1 credit hour**
A study of plants in relation to their environment. Three hours of laboratory or field work each week. Offered online and on campus Fall of even-numbered years.

**BIOL 811 – Scientific Illustration 3 credit hours**
An introduction to the discipline of scientific illustration. Students will learn the fundamental principles of creating effective illustrations for the purpose of communicating science. A limited set of media types, both traditional and digital, will be explored. The main focus will be on creating the best images for use in research, teaching, journal publications, presentations, and other applications. Copyright and other legal issues will also be discussed. A basic knowledge of biological concepts is useful; artistic ability not required. Offered online, Spring of even-numbered years.
BIOL 812 – Microbial Diversity 3 credit hours
New techniques in molecular biology have revealed three distinct cell lineages: bacteria, archaea, and eukaryae. When considering microorganisms, this information has created major changes in our understanding of phylogeny and our use of taxonomy. This course consists of two parts. In one part, current taxonomic groupings of microorganisms and their basic characteristics are discussed. The second part of the course focuses on how these groupings were created and weaknesses in our current understanding. This is discussed in theory and also applied by students to sample data sets. Offered online, Spring of even-numbered years.

BIOL 813 – Issues in Bioethics 3 credit hours
Bioethics is the study of ethical controversies in both biology and medicine. Science has progressed significantly in the last century and with this progress has come ethical questions. The intent of this course is to focus on a variety of issues that have arisen, including, but not limited to, assisted reproductive technologies, sex selection, cloning, and stem cell research to name a few. Offered online, Spring of even-numbered years.

BIOL 814 – Plant Pathology 3 credit hours
The course focuses on the biology of plant pathogen interactions. Students will gain an in depth knowledge of the disease processes of a large variety of plant diseases at both the whole plant and the molecular level. Emphasis is also placed on current issues and topics in plant pathology in independent research review projects. Offered online, Spring of even-numbered years.

BIOL 815 – Great Plains Heritage 3 credit hours
This course will provide an overview of the natural history, ecology, and culture of the Great Plains region from a scientific and a historical perspective. Great Plains literature will also be incorporated into the course in order to enhance the knowledge, understanding, and appreciation of the Great Plains by each participant. Offered online on demand.

BIOL 816P – Plant Diversity and Evolution 4 credit hours
Morphology of each group of the plant kingdom. Three hours of laboratory each week. Offered on-campus, Spring of odd-numbered years. Additional Course Fee Required

BIOL 818P – Plant Taxonomy 3 credit hours
Collection and identification of vascular plants with emphasis on the prairies and plains. A family approach is utilized. Three hours of laboratory or fieldwork each week. Offered on-campus, Fall only. Additional Course Fee Required

BIOL 820 – Introduction to Graduate Study 3 credit hours
An introduction to graduate study and requirements at UNK with emphasis on research methods and biological techniques for the professional teacher and biologist. Students will gain an appreciation for the scientific method by formulating good scientific questions including sound null and alternative hypotheses, design experimental methods addressing the hypotheses and propose appropriate statistical tests for evaluation of results. Students will practice the art of locating and understanding scientific literature. In addition, students will engage in scientific writing which will include the submission of a research proposal. Offered online, every semester and on-campus, Fall and Spring. Prerequisite: Biology majors or permission

BIOL 821 – Directed Readings 1-3 credit hours
Enables the student to supplement knowledge in selected areas of biology. Primarily independent readings as assigned by the instructor. Readings in Genetic & Societal Problems Readings in Biological Techniques Readings in Vertebrate Biology Readings in Invertebrate Biology Readings in Aquatic Biology Readings in Cell Biology Readings in Recent Developments in Biology Readings in Systematics and Ecology Readings in Evolution Readings in Botany Readings in Microbiology Readings in Developmental Biology
Department Consent Required
Total Credits Allowed: 6.00

BIOL 822 – Advances in Biology 1-3 credit hours
Recent advances in biological topics will be covered. A maximum of 6 hours credit may be counted toward a degree.
Total Credits Allowed: 6.00

BIOL 823 – Environmental Biology 3 credit hours
Environmental biology focuses on the interface of human activity and the natural biological world. The impacts of humans on biogeochemical cycles, ecosystems, and individual species are examined. The role of governmental policies and politics is a part of this discipline and is reviewed. Recent scientific research and reports are used to predict what the future challenges are to humans and organisms in the face of the rapid changes brought about by human activity. Offered online, Fall of even-numbered years.

BIOL 824 – Principles of Ecology 3 credit hours
Ecology is the study of how species interact with each other and with their abiotic environment. There are many disciplines within ecology that we will touch on, including marine ecology, ecological physiology, population biology, and community ecology. This class will summarize current ecological knowledge, and students will read a number of classic papers in the field. Offered online, Spring of odd-numbered years.

BIOL 825 – Tropical Island Biology 2 credit hours
This course uses Hawaii as a case study in biology. Most classes in biology programs focus on a discipline (or sub-discipline) and the class works through the various aspects of that area of study. This class will take a different approach. Here the focus will be on this one area of the Earth and the class will explore various scientific aspects of this island chain. The class will investigate the geology, biogeography, biological evolution, invasive species, and current conservation efforts of the biological diversity of the Hawaiian islands. Offered online on demand.

BIOL 827 – Biological Statistics 3 credit hours
This class is divided into two main areas. The first is biological statistics: the collection and analysis of scientific data. The second area is experimental design: how an experimental hypothesis is built and what are the pieces and procedures needed to conduct a successful experiment. The class is not mathematically intensive and relies on the power of computers beyond a few examples done by hand. The class includes both parametric and non-parametric statistics with continuous and categorical variables. Offered online every semester.

BIOL 828 – Human Evolution 3 credit hours
Human evolution has been an interest of humans probably ever since people could think about the idea. This course examines the current state of scientific knowledge of human origins. The class will focus primarily on anthropological evidence, but also include genetic and behavioral information. The class is primarily a reading and discussion course. Offered online, Fall of even-numbered years.
Department of Biology

**BIOL 829 – Ecological Anthropology** 2 credit hours
This course is a study of human civilization through the lens of biology. Readings specifically examine the role of biogeography, domesticable species distribution, and how the distribution of other natural resources has affected which human societies have been the most successful. The class also focuses on why certain civilizations have failed. This is a reading course with an emphasis on discussion. Offered online, Summer of odd-numbered years.

**BIOL 830P – Special Topics in Biology** 1-3 credit hours
Topics are studied which are not assigned or covered in other courses in the department. The format of this course will vary depending on the topic of instruction and the needs of students. Topics in Botany Topics in Fresh Water Biology Topics in Vertebrate Biology Topics in Invertebrate Biology Topics in Nebraska Flora Topics in Physiology
Total Credits Allowed: 15.00

**BIOL 831 – Biological Research** 1-3 credit hours
Independent investigation of biological problems. A maximum of three hours credit may count toward the 36 hours required for the thesis option. Offered on-campus, every semester.
Total Credits Allowed: 6.00

**BIOL 831A – Biological Research: Hypotheses and Justification** 1 credit hour
This course is limited to students admitted to the online MS in Biology Program. Students will identify a research project and, with the help of a faculty mentor, develop testable hypotheses and write a referenced justification for the research. Credit 1 of 6 credits of BIOL 831 required for the degree. It is recommended that students have taken six graduate Biology credit hours in addition to BIOL 820 before enrolling in this class. Offered online, every semester.
Prerequisite: BIOL 820 and permission.
Department Consent Required

**BIOL 831B – Biological Research: Methodology** 1 credit hour
Students must take concurrently with BIOL 831C. This course is limited to students admitted to the online MS in Biology Program. Students will develop detailed methodology, statistical analysis, and budget to investigate the hypotheses identified in BIOL 831A. If possible, preliminary trials will be conducted. Credit 2 of the 6 credits of BIOL 831 required for the degree. Offered online, every semester.
Prerequisite: BIOL 820 and permission and completion of or concurrent enrollment in BIOL 831A.

**BIOL 831C – Biological Research: Annotated Bibliography** 1 credit hour
Students must take concurrently with BIOL 831B. This course is limited to students admitted to the online MS in Biology Program. Students will conduct a complete literature review (annotated bibliography) of their topic and obtain a minimum of 50 peer-reviewed references related to their research identified in BIOL 831A. Credit 3 of the 6 credits of BIOL 831 required for the degree. Offered online, every semester.
Prerequisite: BIOL 820 and permission and completion of or concurrent enrollment in BIOL 831B.

**BIOL 831D – Biological Research: Data Collection** 1 credit hour
This course is limited to students admitted to the online MS in Biology Program. Students will gather data according to the methodology developed in BIOL 831B. IRB and/or IACUC approval, if required, must be obtained prior to enrollment. Credit 4 of the 6 credits of BIOL 831 required for the degree. Offered online, every semester.
Prerequisite: BIOL 820 and permission and completion of or concurrent enrollment in BIOL 831C.

**BIOL 831E – Biological Research: Manuscript** 1 credit hour
This course is limited to students admitted to the online MS in Biology program. Students will use appropriate statistics to analyze their results, construct appropriate tables and figures to visually present the results, and use text to verbally describe the results. Students will evaluate their results in the framework of the hypotheses developed in BIOL 831A. Credit 5 of the 6 credits of BIOL 831 required for the degree. Offered online, every semester.
Prerequisite: BIOL 820 and permission and completion of or concurrent enrollment in BIOL 831D.

**BIOL 831F – Biological Research: Statistical Analysis** 1 credit hour
This course is limited to students admitted to the online MS in Biology program. Students will submit a final manuscript summarizing their work done in BIOL 831A-E. The manuscript will be prepared in manner consistent with submission to a professional journal in their field of study. Credit 6 of the 6 credits of BIOL 831 required for the degree. Offered online, every semester.
Prerequisite: BIOL 820 and permission and completion of or concurrent enrollment in BIOL 831E.

**BIOL 832 – Crane Ecology** 1 credit hour
This course is an in-depth study of the behavior and ecology of cranes. Assigned readings from the scientific literature, one writing assignment and online discussions will be used to explore a variety of topics including: reproductive biology, wintering ecology, migratory behavior, conservation and management of cranes. Plan to spend at least several hours each week on reading, writing, and responding to topic discussions. Offered online, Fall of odd-numbered years.

**BIOL 833P – Invertebrate Zoology** 3 credit hours
This course provides an introduction to the biology of specific phyla, classes, and orders of invertebrates with emphasis on classification, morphology, structure and function of their internal anatomy, ecology and evolution, and fundamental concepts characteristic of this diverse animal group. Laboratory stresses anatomy, natural history and ecology of invertebrates. Three hours of laboratory every week.
Prerequisite: BIOL 105 and BIOL 106 or permission of instructor
Additional Course Fee Required

**BIOL 834 – Conservation Biology** 3 credit hours
An overview of conservation biology and its importance. Special emphasis is placed on ecological, economic, and social issues relevant to biological rarity. Offered online, Spring of odd-numbered years.

**BIOL 835P – Herpetology** 3 credit hours
Herpetology provides an introduction to reptiles and amphibians with an emphasis placed on morphology, taxonomy, life history, and ecology of the major groups. Together, reptiles and amphibians are more diverse, numerous, and important to many terrestrial ecosystems than any other organism. You will learn life histories, their role in the ecosystem, reasons for the decline of many species and increase in other species and their importance to humans. Offered on-campus, Fall of odd-numbered years and online on demand.
Additional Course Fee Required

**BIOL 836 – Biology of Size** 3 credit hours
This class examines the importance of size for biological organisms from bacteria to blue whales, microcosms to large-scale communities. Often in biology we fail to consider the importance of physical laws which determine rates of diffusion and heat transfer, transfer of force and momentum, the strength of structures, the dynamics of locomotion and more. This class attempts to rectify this oversight with readings and lectures examining the impacts of being a given size. Offered online, Summer of odd-numbered years.
BIOL 838 – Essential Human Anatomy 3 credit hours
Human anatomy including essential aspects of functional morphology will be covered. Topics covered may include the integumentary, skeletal, muscular, nervous, endocrine, circulatory, lymphatic, respiratory, urinary, digestive and reproductive systems. Detailed discussion of specific anatomical regions will be required. Offered online, Fall only.

BIOL 839 – Human Physiological Systems 3 credit hours
General human physiology will be studied with an emphasis on systems. The integumentary, skeletal, muscular, nervous, endocrine, circulatory, lymphatic, respiratory, urinary, digestive, immune and reproductive systems will be discussed. Salient mechanical, physical and biochemical processes of organs, tissues and cells will be covered. Anatomy will be included at a level necessary to make sense of the system’s function. Offered online, Spring only.

BIOL 840 – Infectious Diseases 3 credit hours
This course is an introduction to medical microbiology with coverage of viral, bacterial, fungal, and protozoan disease causing microorganisms. It will cover the basic mechanisms of infection, disease progression, and immune response. It is strongly suggested that students have taken an introductory microbiology course before taking this class. Offered online, Fall only.

BIOL 840P – Infectious Diseases 4 credit hours
This course focuses on the medical aspects of microbiology. The course will cover viruses, bacteria, fungi, and parasitic protists. We will study the mechanisms of infection, disease progression, and immune response. Three hours of laboratory will be required each week. Offered on-campus, Fall of odd-numbered years.

Additional Course Fee Required

BIOL 841 – Virology 3 credit hours
An in-depth discussion of the principles of modern virology. Major topics of discussion will include: virus replication strategies, virus structure, virus infection and disease, and host resistance to disease. A course in genetics and a course in cell biology or biochemistry is strongly recommended. Offered online, Spring only.

BIOL 844 – Molecular Biotechnology 3 credit hours
The course will consist of a short review of pertinent principles in protein structure and function, enzyme mechanisms and kinetics, and the basics of the genetic dogma and recombinant DNA technology. The bulk of the course will be made up of a topical consideration of subjects in biotechnology such as: the production of protein pharmaceuticals, genetic engineering of animals and plants, and cloning of organisms. Special consideration will be given to the molecular mechanisms behind the processes discussed. Offered online, Spring of odd-numbered years.

BIOL 845 – Forensic Biology 3 credit hours
This course will be a wide consideration of all aspects of Forensic Biology ranging from general considerations to the latest in molecular techniques. We will also review current literature, discuss case studies, and look at some mass-market publications on crime scene investigation. Offered online, Summer only.

BIOL 846 – Cancer Biology 3 credit hours
This course is designed as a survey of the current state of knowledge in the cellular and molecular biology of cancer processes. The students will also review current literature in cancer biology by analyzing and critiquing current articles. Offered online, Fall of odd-numbered years.

BIOL 850P – Molecular Biology 3 credit hours
This course is an in-depth discussion of the principles of modern molecular biology. Major topics to be covered are: (1) Organization and evolution of eukaryotic genomes and genes, (2) prokaryotic and eukaryotic transcription and its regulation, (3) RNA splicing and processing, (4) epigenetic mechanisms, and (5) RNA catalysis and interference. Three hours of lecture per week. Offered on-campus, Fall only.

Prerequisite: BIOL 309 and BIOL 360 or permission of instructor

BIOL 852P – Techniques in Molecular Biology 3 credit hours
The course is designed to familiarize the student with modern molecular biology techniques. Students will be exposed to a number of techniques including RNA isolation, polymerase chain reaction, cloning DNA, sequencing DNA, computer analysis of sequence data, expression of cloned genes in bacteria and protein analysis and purification procedures. One lecture and two three hour laboratories per week. Offered on-campus, Spring only.

Prerequisite: BIOL 309 or CHEM 351 and CHEM 351L or permission of instructor

Additional Course Fee Required

BIOL 853 – Genome Evolution 3 credit hours
This course is a survey of current research in genome evolution with an emphasis on understanding the unifying evolutionary principles. Topics include gene duplication, polyploidy, mobile elements and comparative genomics. Offered online on demand.

BIOL 854 – Biological Application of GIS 3 credit hours
This class introduces students to Geographical Information Systems (GIS) and associated concepts and technologies. The class curriculum includes an introduction to (and temporary license for) the ArcGIS GIS software package, cartographic principles, online GIS data sources, and the functioning of Global Positioning System (GPS). Particular attention will be paid to organizing GIS data into appropriate data structures and the completion of independent research projects. The independent projects have been found to be a crucial component for becoming familiar with much of the material covered in the class. No prior experience with GIS or GPS software or GPS receivers is expected. Offered online, Fall of odd-numbered years and on-campus on demand.

BIOL 856P – Regional Field Study 1-4 credit hours
This course is designed to introduce students to detailed biological studies of specific regions. Regions studied may vary depending upon instructor availability and student needs. Topics may include but are not limited to: Tropical and Marine Island Biology Natural History of Nebraska Natural History of the Southwest

Total Credits Allowed: 4.00

BIOL 857 – Human Histology 3 credit hours
Histology is also called micro-anatomy. This course examines animal bodies on the tissue and cellular level. Most examples will be from human anatomy. Basic tissue types will be studied as well as organ structure and function. As a distance class, micropectographs will be used (not glass slides) from the web, as well as from an assigned textbook. No prior experience with histology is expected. Offered online, Summer of even-numbered years.

BIOL 858 – Physiology of Stress 3 credit hours
An examination of how living organisms cope with short- and long-term exposure to extreme environmental conditions related to nutrient and water availability, temperature, and pressure. A basic understanding of organismal physiology is required. Offered online, Summer only.
BIOL 859 – Biology of the Brain 3 credit hours
This course will focus on the central nervous system (brain and spinal cord) and will include gross anatomical features and landmarks of the cerebral hemispheres, diencephalons, brainstem, cerebellum and spinal cord. Physiological aspects will include the generation and modification of action potentials as well as normal functions of the specific regions of the central nervous system. Selected abnormal functions will also be studied. The interdependency of the central nervous system to itself (various pathways between the spinal cord and within the brain) as well as to the peripheral nervous system and select organ systems will complete the focus of the course. It is recommended that students have taken anatomy and physiology before enrolling in this course.

BIOL 860 – Concepts of Genetics 3 credit hours
Application based course covering the classical and molecular principles of inheritance. Concepts covered include various historical concepts surrounding transmission, molecular, and population genetics, current state of the discipline, and the future outlook for the field. Students are required to demonstrate their knowledge and critical thinking skills through quizzes, tests, and writing assignments. Offered online, Fall of odd-numbered years.

Additional Course Fee Required

BIOL 861P – Human Genetics 3 credit hours
The course focuses on contemporary human genetics with emphasis on genetic diseases. A study of the genetic basis and frequency of genetic defects in man and genetic counseling. Offered on-campus, Spring of even-numbered years and online, Fall of even-numbered years.

BIOL 862P – Animal Behavior 3 credit hours
An introduction to the science of ethology. The course will examine behavior genetics, physiology of behavior, ecology of behavior, and the evolution of behavior. Three hours of laboratory each week. Offered on-campus, Spring of odd-numbered years and online, Summer of odd-numbered years.

Additional Course Fee Required

BIOL 863 – Biological Perspectives 3 credit hours
A review of the major advances in biology from the ancients to the present, with emphasis on paradigm shifts and science as a human endeavor. Offered online, Spring and Summer.

BIOL 865P – Physiology 3 credit hours
The structure and function of the systems of the vertebrate body. Three hours of laboratory each week. Offered on-campus, Spring only.

Additional Course Fee Required

BIOL 866 – Functional Morphology 3 credit hours
A study of the structure, form, and function of morphological adaptations in plants and animals as examined through mechanical, ecological, and evolutionary perspectives. This course will investigate the form and functions of organisms largely by examination of the scientific literature. Offered online, Spring of odd-numbered years.

BIOL 868P – Parasitology 2 credit hours
The basic concepts of parasitology with emphasis on the major types of medically and economically important parasites (protozoan, helminth and arthropods) will be covered, including life cycle, diagnosis, treatment, immunity, pathology, control, and ecology and evolution. Laboratory stresses identification of the various developmental stages of these parasites. Prerequisite: BIOL 105 and BIOL 106. Corequisite: BIOL 868L.

BIOL 869 – Conservation of Birds and Mammals 3 credit hours
Wildlife is defined as wild birds and wild mammals. It does not include other vertebrates (fish, amphibians, or reptiles), nor does it include invertebrate animals. This is a course about the Principles of Wildlife Conservation, and is not specifically about wildlife management, or even wildlife ecology. However, both these latter subjects will be examined briefly. Wildlife conservation usually involves as much if not more of the following disciplines than it involves biology: history, sociology, and politics. It is recommended that you have taken a course in ecology and statistics before enrolling in this course. Offered online, Summer of even-numbered years.

BIOL 870 – Insect Biology 3 credit hours
An introduction to insects and related arthropods. Emphasis is placed on morphology, physiology, taxonomy and ecology of insects. Offered online, Summer of even-numbered years.

BIOL 870P – Insect Biology 3 credit hours
An introduction to insects and related arthropods. Emphasis is placed on morphology, physiology, taxonomy and ecology of insects. Three hours of laboratory or field work each week. Offered on-campus, Fall of odd-numbered years.

Additional Course Fee Required

BIOL 871P – Methods in Secondary Science Teaching 3 credit hours
An examination of current developments in curricula, methods, and materials. Laboratory time arranged. Offered on-campus, Fall only.

Additional Course Fee Required

BIOL 872P – Ichthyology 3 credit hours
An introduction to birds: emphasis on bird identification skills, behavior, classification, ecology, and physiology. Three hours of laboratory or field work each week. Offered on-campus, Spring of even-numbered years.

BIOL 873P – Ornithology 3 credit hours
An introduction to birds: emphasis on bird identification skills, behavior, classification, ecology, and physiology. Three hours of laboratory or field work each week. Offered on-campus, Spring of even-numbered years.

BIOL 874P – Mammalogy 3 credit hours
Introduction to mammals: ecology, classification, physiology, and behavior. Three-hour laboratory per week for preparation and identification of specimens. Offered on-campus, Fall of even-numbered years.

Additional Course Fee Required

BIOL 875 – Internship in Biology 1-9 credit hours
Taken as part of the professional semester. Emphasizes the professional development of the individual. Total Credits Allowed: 9.00

BIOL 876 – Natural Science Curriculum 3 credit hours
For practicing science teachers. Emphasis on scientific literacy and the alignment of K-12 science curricula with state and national standards and benchmarks. Offered online on demand.
BIOL 877 – Writing in the Sciences  2 credit hours
Academic writing in the sciences can be a daunting solitary endeavor. It is the hope of this course to take away the fear of the blank page and help to engage the class with a sense of community that is inherently beneficial to the writing process. This course is particularly geared towards students who have been away from academic writing for many years, or perhaps decades. This will be an introduction into this type of writing, complete with an overview of the materials available to you as a distance student. The primary purpose of this course is to improve your written communications skills. We will focus on your ability to prepare and write technical papers in a professional scientific format. A crucial part of learning to write technical papers is reading them and practicing writing them yourself. Plan to spend at least several hours each week on reading, writing, and practicing the skills we cover in this course. Offered online, Fall of even-numbered years.

BIOL 880 – Seminar  1 credit hour
A discussion of selected topics in a seminar format. Offered on-campus, Fall and Spring.
Total Credits Allowed: 3.00

BIOL 881 – Current Issues in Biology  1 credit hour
This course will expose the student to many different biological research topics, stimulate discussion on these topics, promote awareness of current issues in biology, help students critically analyze relevant and contemporary primary literature and ensure students are able to prepare appropriate presentations for scientific meetings. This course is repeatable for up to 3 credit hours. Offered online, every semester.
Total Credits Allowed: 3.00

BIOL 882P – Seminar in Molecular Biology  1 credit hour
An in depth discussion of current topics in molecular biology. Guest speakers, faculty and students will give presentations weekly. Some presentations will consist of the students reading an assigned paper followed by an oral presentation of its contents. Student participants are expected to read all journal articles presented, whether they are presenting or not. This course does not serve as a substitute for BIOL 880 Seminar. Offered on-campus, every semester.
Total Credits Allowed: 2.00
Prerequisite: BIOL 360 or permission of instructor

BIOL 883 – Aquatic Trophic Ecology  3 credit hours
This course was developed to provide a thorough examination of the interactions between abiotic and biotic components of freshwater ecosystems incorporating both theoretical and applied aspects of aquatic food web management. Major themes of the course will include nutrient cycling, trophic state and eutrophication, predation and food webs, and fisheries ecology. Selected scientific literature and text readings will stress professional differences of opinion during discussion of topics, which is intended to guide students toward an understanding that ecological principles rarely are simple and that current dogma can at times be incorrect or incomplete. Finally, this course is directed at improving student communication (written and electronic information/technology based) and critical thinking skills. Offered online, Summer of odd-numbered years.

BIOL 884 – Freshwater Management Techniques  3 credit hours
Through videotaped lectures, reading and writing assignments, and on-line discussions, students will be introduced to both freshwater ecosystems and fishery management. Students will learn to analyze freshwater management problems using multiple techniques, to suggest alternative approaches, and to identify consequences of those approaches. Offered online, Fall of even-numbered years.

BIOL 885P – Molecular Genetics  3 credit hours
An in-depth study of gene structure and replication in prokaryotes and eukaryotes. Gene function in developing and differentiated cells will also be studied in detail.

BIOL 886 – Sexual Selection  1 credit hour
Small group discussions will be used to discuss readings on the role of sexual selection in evolution. Offered online, Spring of odd-numbered years.

BIOL 887 – Fisheries Ecology  3 credit hours
This course was developed to provide a thorough examination of both theoretical and applied aspects of fisheries ecology. Major themes of the course will include individual ecology (feeding, growth, and reproduction), population ecology, and community ecology (predation and competition). Selected scientific literature and text readings will stress professional differences of opinion during discussion of topics, which is intended to guide students toward an understanding that ecological principles rarely are simple and that current dogma can at times be incorrect or incomplete. Finally, this course is directed at improving student communication (written and electronic information/technology based) and critical thinking skills. Offered online, Summer of odd-numbered years.

BIOL 896 – Thesis  1–6 credit hours
Offered on-campus, every semester.
Total Credits Allowed: 6.00