

# ECU COURSE CATALOG

## 2025-2026 BIOLOGY COURSES

### BIOL-1114 General Biology I 4 Credits

INCLUDES IN-DEPTH STUDY OF FUNDAMENTAL BIOLOGICAL PRINCIPLES AND CONCEPTS RELEVANT TO THE BIOLOGY OF ANIMALS, PLANTS, FUNGI AND MICROBES. EMPHASIS IS ON THE CHARACTERISTICS OF LIFE, BIOLOGICAL CHEMISTRY, CELL STRUCTURE AND FUNCTION, CELLULAR ENERGETICS, MOLECULAR BIOLOGY AND GENETICS. INCLUDES BIOLOGICAL LABORATORY EXPERIENCE WITH EMPHASIS ON CRITICAL THINKING AND PROBLEM SOLVING. Required Previous: Class Pre-requisite(s): 19 on ACT-Science or SAT equivalent, PHSCI-0123, or Placement exam.

### BIOL-1114L General Biology I Laboratory 0 Credits

LAB COURSE FOR BIOL-1114.

### BIOL-1134 General Biology II 4 Credits

ONE OF A TWO-SEMESTER SEQUENCE OF INTRODUCTORY BIOLOGY COURSES WITH LABS DESIGNED SPECIFICALLY FOR BIOLOGY MAJORS. MAJOR BIOLOGICAL PRINCIPLES AND CONCEPTS AS ILLUSTRATED IN A SURVEY OF THE DIVERSITY, BEHAVIOR, PHYSIOLOGY, AND ECOLOGICAL FUNCTIONS OF ANIMALS, PLANTS, FUNGI, AND MICROBES. EMPHASIS IS ON EVOLUTION, ECOLOGY, AND DIVERSITY. WILL INCLUDE BIOLOGICAL LABORATORY EXPERIENCE WITH EMPHASIS ON PROBLEM SOLVING. WILL INCLUDE TRAINING IN SCIENTIFIC PROCEDURES, INCLUDING LABORATORY TECHNICAL SK Required Concurrent: Take BIOL-1134L

### BIOL-1134L General Biology II Laboratory 0 Credits

LAB COURSE FOR BIOL-1134.

### BIOL-1214 General Botany 4 Credits

MORPHOLOGY, PHYSIOLOGY AND ECOLOGY OF THE SEED PLANTS WITH A BRIEF SURVEY OF THE PLANT KINGDOM. LECTURE, LABORATORY AND FIELD. Required Concurrent: Take BIOL-1214L

### BIOL-1214L General Botany Laboratory 0 Credits

LAB COURSE FOR BIOL-1214.

### BIOL-1314 General Zoology 4 Credits

A SURVEY OF MAJOR PHyla OF THE ANIMAL KINGDOM, GENERAL MORPHOLOGY, LIFE HISTORIES, AND PRINCIPLES OF ANIMAL SYSTEMATICS. LECTURE AND LABORATORY. Required Concurrent: Take BIOL-1314L

### BIOL-1314L General Zoology Laboratory 0 Credits

LAB COURSE FOR BIOL-1314.

### BIOL-2002 Introductory Research Experience 2 Credits

DESIGNED TO BE AN INTRODUCTION TO RESEARCH IN THE BIOLOGICAL SCIENCES. MUST HAVE PERMISSION FROM RESEARCH MENTOR WITH WHOM STUDENT WILL WORK CLOSELY TO DEVELOP AN INDEPENDENT RESEARCH PROJECT. LABORATORY AND/OR FIELD. Required Previous: BIOL-1114 Must have permission from research mentor.

### BIOL-2103 Horticulture 3 Credits

SURVEY AND PRACTICE OF THE HORTICULTURE DISCIPLINE INCLUDING PLANT GROWTH AND PROPAGATION FOR GREENHOUSE, AGRICULTURAL, LANDSCAPING, THERAPEUTIC AND HOBBYIST PRACTICES THROUGH LECTURE, LABORATORY AND FIELD DELIVERY. Required Previous: BIOL-1114 with a grade C or better.

### BIOL-2113 Medical Terminology 3 Credits

A STUDY OF THE LANGUAGE OF MEDICINE INCLUDING WORD CONSTRUCTION, DEFINITIONS, AND USE OF TERMS RELATED TO ALL AREAS OF MEDICAL SCIENCES, HOSPITAL SERVICES AND THE ALLIED HEALTH SPECIALTIES.

### BIOL-2184 Human Anatomy 4 Credits

AN INTRODUCTORY STUDY OF THE GROSS ANATOMY OF THE HUMAN BODY WITH AN INTRODUCTION TO MICROANATOMY. LABORATORY STUDIES OF THE HUMAN SKELETON, MODELS AND OTHER VISUAL MATERIALS. DISSECTION OF THE CAT WITH REFERENCE TO MAN. LECTURE AND LABORATORY. DEGREE CREDIT NOT ALLOWED IN BOTH 2184 AND 3615. Required Concurrent: Take BIOL-2184L

### BIOL-2184L Human Anatomy Laboratory 0 Credits

LAB COURSE FOR BIOL-2184.

### BIOL-2243 Introduction to Biotechnology 3 Credits

A SURVEY OF THE MOST ACTIVE AREAS IN THE FIELD OF BIOTECHNOLOGY. LECTURES WILL COVER TOPICS SUCH AS DNA MANIPULATION, PROTEIN ENGINEERING, LARGE-SCALE CULTIVATION OF MICROORGANISMS, STEM CELL RESEARCH, VACCINE AND MONOCLONAL ANTIBODY PRODUCTION, MOLECULAR MEDICINE, GENE THERAPY, AND GENETIC ENGINEERING IN PLANTS AND ANIMALS. Required Previous: BIOL-1114 or BIOL-1214 or BIOL-1314

### BIOL-2344 General Microbiology 4 Credits

THE DISTRIBUTION, DISSEMINATION, CLASSIFICATION, AND IDENTIFICATION OF MICROORGANISMS, SPECIAL ATTENTION TO ORGANISMS CAUSING DISEASE AND TO IMMUNITY FROM THESE ORGANISMS. LECTURE AND LABORATORY. Required Concurrent: Take BIOL-2344L

### BIOL-2344L General Microbiology Laboratory 0 Credits

LAB COURSE FOR BIOL-2344.

### BIOL-2644 Invertebrate Zoology 4 Credits

GENERAL INVERTEBRATE ZOOLOGY, INCLUDING MORPHOLOGY, TAXONOMY AND LIFE HISTORIES OF REPRESENTATIVES OF THE INVERTEBRATE GROUPS. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314

### BIOL-2773 Forensic Biology 3 Credits

A STUDY OF THE SCIENTIFIC METHOD AND BIOLOGICAL TECHNIQUES THAT ARE USED IN FORENSIC INVESTIGATION (CRIMINALISTICS). LECTURES AND LABORATORY SESSIONS WILL COVER THE METHODS OF FORENSIC INVESTIGATIONS WITH AN EMPHASIS ON THE EXAMINATION OF PHYSICAL EVIDENCE USED IN A COURT OF LAW. SPECIFIC TOPICS INCLUDE COMPARATIVE MICROSCOPY OF HAIR, TEXTILES, BLOOD, AND BULLETS, PROTEIN ANALYSIS USED TO DISTINGUISH AMONG SUSPECTS, ANALYTICAL METHODS USED TO IDENTIFY CERTAIN DRUGS, AND DNA ANALYSIS USED TO IDENTIFY. Required Previous: BIOL-1114 OR BIOL-1214 OR BIOL-1314

### BIOL-2773L Forensic Biology Laboratory 0 Credits

LAB COURSE FOR BIOL-2773.

### BIOL-2881 Special Studies in Biology (Subject named in title listing) 1 Credit

DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

### BIOL-2882 Special Studies in Biology (Subject named in title listing) 2 Credits

DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

### BIOL-2883 Special Studies in Biology (Subject named in title listing) 3 Credits

DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

### BIOL-2884 Special Studies in Biology (Subject named in title listing) 4 Credits

DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

### BIOL-3013 Research Methods and Bioethics 3 Credits

AN EXAMINATION OF THE METHODS AND TECHNIQUES THAT HAVE LED TO SIGNIFICANT DISCOVERIES AND THEMES IN MODERN BIOLOGICAL SCIENCES, RANGING FROM BIODIVERSITY AND EVOLUTION THROUGH CELL BIOLOGY AND GENETICS. TECHNIQUES IN THE CRITICAL EVALUATION OF SCIENTIFIC LITERATURE AND CURRENT ISSUES WILL BE INCLUDED THROUGHOUT THE COURSE, AS WELL AS THE ETHICAL ASPECTS OF DATA COLLECTION AND ANALYSES. CONSIDERATION OF SPECIFIC BIOMEDICAL ETHICS ISSUES WILL BE INCORPORATED INTO CLASS ACTIVITIES. Required Previous: BIOL-1214 or BIOL-1314

### BIOL-3023 Animal Nutrition 3 Credits

THE NUTRIENTS REQUIRED BY ANIMALS, THEIR FUNCTIONS, AND THE INTERRELATIONSHIPS AND THE PROCESSES OF THEIR UTILIZATION. IN ADDITION, FEEDSTUFF COMPOSITION AND THEIR USE IN DIET AND RATION

FORMULATION WILL BE COVERED. EMPHASIS WILL BE PLACED ON BOTH RUMINANT AND NON-RUMINANT SPECIES. Required Previous: BIOL-1114

**BIOL-3034 Medical Botany 4 Credits**  
A SURVEY OF PLANTS AFFECTING HUMAN HEALTH INCLUDING HOW PLANTS WERE HISTORICALLY USED AND ARE CURRENTLY USED, WITH AN EMPHASIS ON BIOLOGICALLY ACTIVE CONSTITUENTS. Required Previous: BIOL-1214 with a grade of C or better.

**BIOL-3034L Medical Botany Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3034.

**BIOL-3111 Peer-To-Peer Laboratory Experience 1 Credit**  
INTRODUCES THE STUDENT TO CLASSROOM DYNAMICS THROUGH PEER-TO-PEER EXPERIENCES IN A LABORATORY SETTING. STUDENTS WILL AID IN GENERAL PREPARATION AND COMPLETION OF LABORATORIES THROUGHOUT THE SEMESTER, CRITICALLY EVALUATE PEER LABORATORY HANDOUTS, AND LEAD A LABORATORY DISCUSSION.

**BIOL-3134 Field Zoology 4 Credits**  
AN INTRODUCTION TO LOCAL ANIMAL LIFE BASED UPON CLASSIFICATION, DISTRIBUTION, AND NATURAL HISTORY OF REPRESENTATIVES OF THE ANIMAL PHYLA OF THIS REGION. LECTURE, LABORATORY, AND FIELD. Required Concurrent: Take BIOL-3134L

**BIOL-3134L Field Zoology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3134.

**BIOL-3143 Ethnobotany 3 Credits**  
A SURVEY OF PLANT USE BY PEOPLE, INCLUDING SUCH TOPICS AS MEDICINAL, SOCIETAL, CULTURAL, AND ECONOMIC USES OF PLANTS FROM PRE-HISTORY TO CURRENT. Required Previous: BIOL-1114 or BIOL-1214

**BIOL-3214 Field Ornithology 4 Credits**  
AN INTRODUCTION TO AVIAN BIOLOGY WITH EMPHASIS ON FIELD STUDY OF LIFE HISTORY, ECOLOGY, AND ETHOLOGY OF LOCAL BIRDS. LECTURE, LABORATORY AND INDEPENDENT FIELD PROJECTS. Required Previous: BIOL-1314

**BIOL-3214L Field Ornithology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3214.

**BIOL-3234 General Entomology 4 Credits**  
FUNDAMENTAL PRINCIPLES OF INSECT LIFE; CLASSIFICATION, LIFE HISTORIES AND ECONOMIC RELATIONS Required Concurrent: Take BIOL-3234L

**BIOL-3234L General Entomology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3034.

**BIOL-3245 Comparative Vertebrate Anatomy 5 Credits**  
COMPARISON OF ANATOMICAL STRUCTURE IN VERTEBRATE TYPES. LECTURE AND LABORATORY. Required Previous: BIOL-1314

**BIOL-3245L Comparative Vertebrate Anatomy Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3245.

**BIOL-3254 Medical Entomology 4 Credits**  
A STUDY OF INSECTS AND OTHER ARTHROPODS WITH RELATION TO THEIR IMPORTANCE IN HUMAN MEDICINE. Required Previous: BIOL-1314

**BIOL-3254L Medical Entomology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3245.

**BIOL-3303 Stream Ecology and Stream Management 3 Credits**  
THE PHYSICAL, CHEMICAL, AND BIOLOGICAL CHARACTERISTICS OF STREAM ECOSYSTEMS WITH AN EMPHASIS ON ANTHROPOGENIC INFLUENCES ON THESE SYSTEMS. A REVIEW OF SELECTED STREAM MANAGEMENT PRACTICES USED TO MITIGATE THESE INFLUENCES THROUGH SELECTED CASE STUDIES OF MAJOR RIVER SYSTEMS FROM AROUND THE WORLD. LECTURE AND FIELD TRIPS TO LOCAL STREAM ECOSYSTEMS. Required Previous: BIOL-1214

**BIOL-3314 Mammalogy 4 Credits**  
AN INTRODUCTION TO MAMMALIAN BIOLOGY, DIVERSITY, ANATOMY, EVOLUTIONARY HISTORY, SYSTEMATICS, AND ZOOGEOGRAPHY. LABORATORY EXERCISES WILL EMPHASIZE STRUCTURAL ANATOMY AND THE IDENTIFICATION AND NATURAL HISTORY OF OKLAHOMA MAMMALS. Required Previous: BIOL-1314

**BIOL-3314L Mammalogy Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3314.

**BIOL-3324 Herpetology 4 Credits**  
AN INTRODUCTION TO THE BIOLOGY OF AMPHIBIANS AND REPTILES INCLUDING ANATOMY, DIVERSITY, EVOLUTIONARY RELATIONSHIPS, PHYSIOLOGY, SYSTEMATICS, AND ZOOGEOGRAPHY. LABORATORY EXERCISES WILL EMPHASIZE STRUCTURAL ANATOMY AND THE IDENTIFICATION AND NATURAL HISTORY OF OKLAHOMA REPTILES AND AMPHIBIANS. Required Previous: BIOL-1314

**BIOL-3324L Herpetology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3324.

**BIOL-3343 Experimental Molecular Biology 3 Credits**  
A STUDY OF THE EXPERIMENTAL APPROACH AND TECHNIQUES USED IN MOLECULAR BIOLOGY. EMPHASIS WILL BE PLACED ON THE EXTRACTION, ISOLATION, AND PURIFICATION OF PROTEINS AND NUCLEIC ACIDS OF BACTERIA, FUNGI, PLANTS, AND ANIMALS. Required Previous: BIOL-1314

**BIOL-3434 Genetics 4 Credits**  
A STUDY OF BASIC PRINCIPLES IN INHERITANCE INCLUDING MENDELISM AND MOLECULAR MECHANISMS AND RECOMBINANT DNA TECHNOLOGY. LECTURE AND LAB. Required Concurrent: Take BIOL-3434L

**BIOL-3434L Genetics Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3434.

**BIOL-3452 Advanced Genetics 2 Credits**  
CONTINUATION OF COURSE 3434. Required Previous: BIOL-3434

**BIOL-3514 General Physiology 4 Credits**  
INCLUDES A STUDY OF THOSE PHYSIOLOGICAL PHENOMENA COMMON TO ALL LIVING ORGANISMS SUCH AS: OSMOREGULATION, FUNCTIONAL COMPOSITION, OXIDATIVE METABOLISM, METABOLIC CONTROL MECHANISMS, INTERNAL DISTRIBUTION SYSTEMS, NUTRITION, EXCRETION, INTEGRATION, AND BIOELECTRICITY. LECTURE AND LABORATORY. Required Concurrent: Take BIOL-3514L

**BIOL-3514L General Physiology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-3514.

**BIOL-3524 Mycology 4 Credits**  
A SURVEY OF FUNGI, INCLUDING THEIR EVOLUTION, MORPHOLOGY, AND ONTOGENY WITH MEDICINAL, AGRICULTURAL, AND ECONOMIC APPLICATIONS. WE WILL USE LECTURE, LABORATORY, AND FIELD TECHNIQUES TO EXPLORE THE FUNGAL WORLD. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1114 or BIOL-1214 or BIOL-2344

**BIOL-3553 Genomics and Bioinformatics 3 Credits**  
INTRODUCTION TO THE STUDY AND ANALYSIS OF GENOMES AND THE FUNCTIONS AND RELATIONSHIPS (BROADLY INCLUDING BIOCHEMICAL ACTIVITY AND BIOLOGICAL FUNCTION) OF ALL THE GENES WITHIN A GENOME. TOPICS WILL INCLUDE TECHNIQUES AND METHODS IN GENETICS, GENOME SEQUENCING, SEQUENCE ALIGNMENT, GENE AND PROTEIN ANALYSIS, MICROARRAY ANALYSIS, PROTEOMICS AND DATABASE SEARCHING. Required Previous: BIOL-1214 or BIOL-1314

**BIOL-3615 Human Anatomy & Physiology 5 Credits**  
AN INTRODUCTION TO THE STRUCTURE AND FUNCTIONS OF THE VARIOUS SYSTEMS OF THE HUMAN BODY INCLUDING A STUDY OF RESPIRATION, DIGESTION, METABOLISM, AND NUTRITION; A STUDY OF THE SPECIAL SENSES, INTERNAL SECRETION, AND MUSCULAR AND NERVOUS SYSTEMS. LECTURE AND LABORATORY. DEGREE CREDIT NOT ALLOWED IN BOTH 3615 AND 3634, OR IN 2184 AND 3615. Required Previous: 4 to 8 hours of Chemistry; Degree credit not allowed in both BIOL-3615 and BIOL-3634 or in BIOL-2184 and BIOL-3615.

<b>BIOL-3623</b>	<b>Biochemistry of Human Diseases</b>	<b>3 Credits</b>	<b>BIOL-4023</b>	<b>Animal Behavior</b>	<b>3 Credits</b>
A SURVEY OF THE BIOCHEMICAL AND MOLECULAR BASIS FOR HUMAN DISEASES. LECTURE TOPICS WILL INCLUDE METABOLIC DISEASES SUCH AS ATHEROSCLEROSIS AND DIABETES, AND THE BIOCHEMISTRY RELATED TO PRION DISEASES, VIROLOGY AND CANCER. Required Previous: BIOL-3434			AN INTRODUCTION TO THE BIOLOGICAL BASIS OF ANIMAL BEHAVIOR, TOPICS INCLUDE THE DEVELOPMENT, PHYSIOLOGICAL MEDIATION, ADAPTIVE SIGNIFICANCE, AND EVOLUTION OF ANIMAL BEHAVIOR. LECTURE. Required Previous: BIOL-1314		
<b>BIOL-3634</b>	<b>Human Physiology</b>	<b>4 Credits</b>	<b>BIOL-4113</b>	<b>Vertebrate Embryology</b>	<b>3 Credits</b>
FUNCTION OF THE HUMAN BODY, PHYSICAL AND CHEMICAL CHANGES WHICH OCCUR IN LIVING SYSTEMS. LABORATORY STUDIES IN THE PHYSICAL AND CHEMICAL NATURE OF ENERGY CHANGES OCCURRING IN LIVING SYSTEMS, AND THEIR EVALUATION UNDER VARIED CONDITIONS. LECTURE AND LABORATORY. DEGREE CREDIT NOT ALLOWED IN BOTH BIOL-3615 AND 3634. Required Concurrent: Take BIOL-3634L			OUTLINE OF FACTS AND FACTORS IN EMBRYONIC DEVELOPMENT OF FISHES, AMPHIBIANS, REPTILES, BIRDS AND MAMMALS. Required Previous: BIOL-1314		
<b>BIOL-3634L</b>	<b>Human Physiology Laboratory</b>	<b>0 Credits</b>	<b>BIOL-4123</b>	<b>Evolution</b>	<b>3 Credits</b>
LAB COURSE FOR BIOL-3634.			MODERN EVOLUTIONARY THEORY WITH SPECIAL REFERENCE TO RELATED GENETIC MECHANISM. Required Previous: BIOL-1214		
<b>BIOL-3654</b>	<b>Histology</b>	<b>4 Credits</b>	<b>BIOL-4144</b>	<b>Natural History of the Vertebrates</b>	<b>4 Credits</b>
INTRODUCTION TO THE ESSENTIALS OF MICROANATOMY OF TISSUES AND ORGANS. LECTURE AND LABORATORY. Required Previous: BIOL-1314			PRINCIPLES OF DISTRIBUTION, CLASSIFICATION, LIFE HISTORIES, ECOLOGY, AND ETHOLOGY OF THE COMMON VERTEBRATES. EMPHASIS GIVEN TO THE TERRESTRIAL FORMS OF LOCAL AREAS. LABORATORY AND FIELD WORK EMPHASIZES COLLECTING TECHNIQUES, IDENTIFICATION AND PREPARATION OF SPECIMENS. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314		
<b>BIOL-3654L</b>	<b>Histology Laboratory</b>	<b>0 Credits</b>	<b>BIOL-4144L</b>	<b>Natural History of the Vertebrates Laboratory</b>	<b>0 Credits</b>
LAB COURSE FOR BIOL-3654.			LAB COURSE FOR BIOL-4144.		
<b>BIOL-3674</b>	<b>Plant Ecophysiology</b>	<b>4 Credits</b>	<b>BIOL-4214</b>	<b>Taxonomy of Flowering Plants</b>	<b>4 Credits</b>
THIS COURSE FOCUSES ON HOW PLANTS COPE WITH ENVIRONMENTAL STRESS THROUGH PHYSIOLOGICAL MECHANISMS AND INTEGRATION. WE WILL USE LECTURE, LAB, AND FIELD TECHNIQUES TO EXPLORE PLANT-ENVIRONMENT INTERACTIONS. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1114			IDENTIFICATION AND CLASSIFICATION OF PLANTS, ESPECIALLY OF THE LOCAL FLORA; CONSTRUCTION AND USE OF KEYS AND THE PREPARATION OF AN HERBARIUM. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1214		
<b>BIOL-3674L</b>	<b>Plant Ecophysiology Lab</b>	<b>0 Credits</b>	<b>BIOL-4214L</b>	<b>Taxonomy of Flowering Plants Laboratory</b>	<b>0 Credits</b>
LAB COURSE FOR BIOL-3674.			LAB COURSE FOR BIOL-4214.		
<b>BIOL-3683</b>	<b>Immunology</b>	<b>3 Credits</b>	<b>BIOL-4313</b>	<b>Cell and Molecular Biology</b>	<b>3 Credits</b>
AN INTRODUCTORY STUDY OF THE PRINCIPLES, MECHANISMS, AND CLINICAL APPLICATIONS OF THE IMMUNE RESPONSE. Required Previous: BIOL-2344			CYTOLOGY, BIOCHEMISTRY, MOLECULAR REGULATION, AND FUNCTION OF CELLS AND ORGANELLES. EMPHASIS IS ON THE EUCARYOTIC CELL. Required Previous: Twelve hours of Biology		
<b>BIOL-3703</b>	<b>Biostatistics</b>	<b>3 Credits</b>	<b>BIOL-4323</b>	<b>Experimental Design in Biological Science</b>	<b>3 Credits</b>
A STUDY OF STATISTICAL METHODS COMMONLY USED IN ENVIRONMENTAL AND LIFE SCIENCE. TOPICS INCLUDE DESCRIPTIVE AND INFERENTIAL STATISTICS AND OTHER RELATED CALCULATIONS. Required Previous: MATH-1513			DESIGN, IMPLEMENTATION AND DATA ANALYSIS USING THE SCIENTIFIC METHOD ON A SPECIFIC TOPIC IN THE BIOLOGICAL SCIENCES. STUDENTS WILL ALSO DEVELOP A RESEARCH PROPOSAL THAT WILL GUIDE INDEPENDENT RESEARCH. LECTURE. Required Previous: BIOL-1214		
<b>BIOL-3712</b>	<b>Foundations of Biology</b>	<b>2 Credits</b>	<b>BIOL-4414</b>	<b>Ecology</b>	<b>4 Credits</b>
A SURVEY BY STUDY OF ORIGINAL SOURCES AND COMPILATIONS OF THE SEQUENCE OF BIOLOGICAL DISCOVERIES AND THE MEN ASSOCIATED WITH THEM, AND OF THE GROWTH OF BIOLOGICAL THEORIES AND THE DEVELOPMENT OF SCIENTIFIC THOUGHT. LECTURE AND LIBRARY.			A STUDY OF THE STRUCTURE AND FUNCTION OF THE ECOSYSTEM INCLUDING A SURVEY OF THE AQUATIC AND TERRESTRIAL HABITATS. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314		
<b>BIOL-3814</b>	<b>Plant Kingdom</b>	<b>4 Credits</b>	<b>BIOL-4414L</b>	<b>Ecology Laboratory</b>	<b>0 Credits</b>
REPRESENTATIVE PLANTS FROM IMPORTANT GROUPS STUDIED AS TO GENERAL STRUCTURE AND FUNCTION OF EACH PART, METHODS OF REPRODUCTION, THE DEVELOPMENT OF PLANTS FROM THE SIMPLEST TO THE HIGHEST FORMS. LECTURE AND LABORATORY . Required Previous: BIOL-1214			LAB COURSE FOR BIOL-4414.		
<b>BIOL-3814L</b>	<b>Plant Kingdom Laboratory</b>	<b>0 Credits</b>	<b>BIOL-4473</b>	<b>Nature Study</b>	<b>3 Credits</b>
LAB COURSE FOR BIOL-3814.			COMMON NAMES, NATURAL HISTORIES, AND INTERRELATIONSHIPS OF LOCAL FLORA AND FAUNA; SURVEY OF HABITAT TYPES, COLLECTIONS, AND NATURE PROJECTS. PROBLEMS OF CONSERVATION OF WILDLIFE. LECTURE AND FIELD LABORATORY. THIS COURSE IS NOT APPLICABLE ON MAJOR OR MINOR IN BIOLOGY.		
<b>BIOL-3934</b>	<b>Limnology</b>	<b>4 Credits</b>	<b>BIOL-4514</b>	<b>Environmental Biology</b>	<b>4 Credits</b>
INTRODUCTION TO THE STUDY OF FRESHWATER BIOLOGY, PHYSICAL AND CHEMICAL FACTORS, PLANKTON ANALYSIS, BOTTOM FAUNA LAKE AND STREAM MAPPING AND PRODUCTIVITY STUDIES. LECTURE AND LABORATORY. Required Concurrent: Take BIOL-3934L			A STUDY OF THE BIOLOGY OF ENVIRONMENTAL PROBLEMS AND HUMAN RELATIONSHIPS TO THE ENVIRONMENT, INCLUDING AIR, WATER, LAND, AND OTHER ORGANISMS. LECTURE AND LABORATORY. Required Previous: BIOL-1114 or equivalent		
<b>BIOL-3934L</b>	<b>Limnology Laboratory</b>	<b>0 Credits</b>	<b>BIOL-4534</b>	<b>Wildlife Management</b>	<b>4 Credits</b>
LAB COURSE FOR BIOL-3934.			THE APPLICATION OF SCIENTIFIC PRINCIPLES TO THE ECOLOGICAL PROBLEMS ASSOCIATED WITH THE MANAGEMENT OF WILDLIFE POPULATIONS AND THEIR HABITATS. LECTURE AND LABORATORY. Required Previous: BIOL-1214 or BIOL-1314		
<b>BIOL-4014</b>	<b>Integrated Pest Management</b>	<b>4 Credits</b>			
A SURVEY OF AGRONOMIC PESTS FOCUSING ON INSECTS INCLUDING THEIR BIOLOGY, MORPHOLOGY, IDENTIFICATION AND MANAGEMENT PRACTICES FOR SUSTAINABLE AGRICULTURE, NATURAL RESOURCES, AND URBAN AND RURAL HEALTH AND WELLBEING. THIS IS A FIELD-BASED COURSE. Required Previous: BIOL-3234 with a grade of C or better.					

**BIOL-4534L Wildlife Management Laboratory 0 Credits**  
LAB COURSE FOR BIOL-4534.

**BIOL-4545 Advanced Molecular Biology 5 Credits**  
AN IN-DEPTH INVESTIGATION OF SPECIFIC ENZYMES AND REAGENTS THAT MODIFY NUCLEIC ACIDS BOTH IN VIVO AND IN VITRO. THE THEORY BEHIND BIOCHEMICAL ACTIVITY, OPTIMAL REACTION CONDITIONS AND PRACTICAL APPLICATIONS IN BIOENGINEERING WILL BE EXPLORED IN BOTH LECTURE AND LABORATORY. THE PRACTICAL PORTION OF THE COURSE WILL BE PROJECT DRIVEN AND WILL INCORPORATE ANALYSES OF THE CURRENT SCIENTIFIC LITERATURE. Required Previous: BIOL-2344

**BIOL-4545L Advanced Molecular Biology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-4545.

**BIOL-4553 Pathogenic Microbiology 3 Credits**  
THE COURSE WILL FOCUS UPON BACTERIAL, FUNGAL, AND VIRAL DISEASES. IT WILL PRIMARILY COVER HUMAN DISEASES AND AGRICULTURALLY IMPORTANT DISEASES IN CROPS AND LIVESTOCK. ROUTES OF INFECTION SUCH AS AIR BORNE, WATER BORNE, FOOD BORNE, SOIL BORNE, ARTHROPOD BORNE, AND SEXUAL CONTACT WILL BE INVESTIGATED. CHARACTERISTICS OF INFECTIVE ORGANISMS AND THEIR MECHANISMS OF INFECTION IN DIFFERENT ORGANISMS WILL BE INCLUDED IN THE DISCUSSION. Required Previous: BIOL-1214 or BIOL-1314

**BIOL-4614 Animal Parasitology 4 Credits**  
MORPHOLOGY, LIFE HISTORY, AND CLASSIFICATION OF THE MORE IMPORTANT PARASITES OF ANIMALS; HOST-PARASITE RELATIONSHIP AND METHODS OF CONTROL. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314

**BIOL-4614L Animal Parasitology Laboratory 0 Credits**  
LAB COURSE FOR BIOL-4614.

**BIOL-4713 Methods of Teaching Secondary Biological Science 3 Credits**  
PHILOSOPHY, METHODOLOGY AND RESOURCES FOR TEACHING HIGH SCHOOL BIOLOGY. Required Previous: Twelve hours for Biology

**BIOL-4763 Biochemical Genetics 3 Credits**  
A STUDY OF THE MOLECULAR MECHANISMS CONTROLLING GENE REGULATION IN VIRUSES, PROKARYOTES AND EUKARYOTES. TOPICS WILL INCLUDE GENETIC ENGINEERING, MOLECULAR GENETICS, AND BIOCHEMISTRY OF MACROMOLECULAR INTERACTIONS. Required Previous: BIOL-1214 or BIOL-1314

**BIOL-4883 Biology Senior Seminar 3 Credits**  
DIRECTED STUDY ON BIOLOGICAL ACTIVITIES RELATED TO SENIOR LEVEL ASSESSMENT. (THIS COURSE SHOULD BE TAKEN DURING THE SEMESTER PRIOR TO GRADUATION.)

**BIOL-4924 Advanced Research Experience 4 Credits**  
A CONTINUATION OF THE RESEARCH EXPERIENCE. MUST HAVE PERMISSION FROM RESEARCH MENTOR WITH WHOM THE STUDENT WILL WORK CLOSELY TO DEVELOP AN INDEPENDENT RESEARCH PROJECT, FOSTERING SKILLS NECESSARY FOR CAREERS IN LABORATORY, FIELD, AND OTHER RESEARCH ORIENTED FIELDS. LABORATORY AND/OR FIELD. Required Previous: BIOL-2002 Must have permission from research mentor.

**BIOL-4981 Seminar in Biology (Subject named in title listing) 1 Credit**  
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4982 Seminar in Biology (Subject named in title listing) 2 Credits**  
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4983 Seminar in Biology (Subject named in title listing) 3 Credits**  
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4984 Seminar in Biology (Subject named in title listing) 4 Credits**  
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4991 Individual Study in Biology (Subject named in title listing) 1 Credit**  
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4992 Individual Study in Biology (Subject named in title listing) 2 Credits**  
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4993 Individual Study in Biology (Subject named in title listing) 3 Credits**  
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-4994 Individual Study in Biology (Subject named in title listing) 4 Credits**  
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

**BIOL-5013 Experimental Design and Data Analysis 3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF EXPERIMENTAL DESIGN TECHNIQUES, CRITICAL THINKING AND ANALYSIS. EMPHASIS WILL BE ON COMMUNICATION OF SCIENTIFIC REASONING, LOGIC, RATIONALE, HYPOTHESIS AND ANALYSIS.

**BIOL-5133 Special Topics in Evolution 3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF THE MODERN THEORY AND MECHANISMS OF EVOLUTION. EMPHASIS ON THE IMPORTANCE OF EVOLUTION AS A UNIFYING CONCEPT TO THE FIELD OF BIOLOGY.

**BIOL-5144 Freshwater Invertebrate Zoology 4 Credits**  
IDENTIFICATION AND ECOLOGY OF FRESH WATER INVERTEBRATES. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-2644

**BIOL-5223 Grant, Science Writing & Communications 3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF RESEARCH CONCEPTUALIZATION FOLLOWED BY WRITTEN AND ORAL COMMUNICATIONS. THE COURSE WILL PROVIDE EXPOSURE TO AVAILABLE TOOLS AND RESOURCES TO GUIDE CONVERSION OF RESEARCH QUESTIONS INTO GRANT PROPOSALS. STUDENTS WILL LEARN TO REPORT THE RESULTS OF THEIR OWN RESEARCH IN THE FORMAT OF A JOURNAL ARTICLE, CONFERENCE-STYLE PRESENTATION, AND POSTER.

**BIOL-5245 Advanced Comparative Vertebrate Anatomy 5 Credits**  
COMPARATIVE MORPHOLOGY OF REPRESENTATIVE VERTEBRATES WITH EMPHASIS ON PHYLOGENY AND ONTOGENY AND CONSIDERATION OF HISTOLOGY AND FUNCTION. LECTURE AND LABORATORY.

**BIOL-5245L Advanced Comparative Vertebrate Anatomy Lab 0 Credits**  
LAB COURSE FOR BIOL-5245.

**BIOL-5254 Special Topics in Medical Entomology 4 Credits**  
COMPARATIVE MORPHOLOGY OF REPRESENTATIVE VERTEBRATES WITH EMPHASIS ON PHYLOGENY AND ONTOGENY AND CONSIDERATION OF HISTOLOGY AND FUNCTION. LECTURE AND LABORATORY.

**BIOL-5254L Special Topics in Medical Entomology Lab 0 Credits**  
LAB COURSE FOR BIOL-5254.

**BIOL-5313 Microbiology and Man 3 Credits**  
A SURVEY OF THE MICROORGANISMS, THEIR FORM, FUNCTION, AND IMPORTANCE IN PERSONAL AND COMMUNITY HEALTH AND ECOLOGY. THIS COURSE DESIGNED PRIMARILY AS GENERAL EDUCATION FOR GRADUATE STUDENTS.

**BIOL-5323 Advanced Cell and Molecular Biology 3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF CYTOLOGY, BIOCHEMISTRY, MOLECULAR REGULATION, AND FUNCTION OF CELLS AND ORGANELLES. EMPHASIS IS ON THE EUKARYOTIC CELL.

**BIOL-5324 Advanced Topics in Herpetology 4 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF RECENT TOPICS IN HERPETOLOGICAL LITERATURE. THIS KNOWLEDGE TO BE ACQUIRED BY

JOURNAL ARTICLES READ AND DISCUSSED, WITH WRITTEN REPORTS ON THREE ARTICLES. LECTURE AND LABORATORY.

**BIOL-5324L      Advanced Topics in Herpetology Lab      0 Credits**  
LAB COURSE FOR BIOL-5324.

**BIOL-5405      Advanced Techniques in Biotechnology      5 Credits**  
GRADUATE COURSE AND LABORATORY TO PROVIDE AN ADVANCED UNDERSTANDING OF BIOTECHNOLOGICAL TECHNIQUES SUCH AS PROTEIN ENGINEERING, DIRECTED EVOLUTION, HIGH-THROUGHPUT SCREENING TECHNIQUES, CELL CULTURING TECHNIQUES, CLONING AND LIBRARY CONSTRUCTION, DIAGNOSTICS, VACCINOLOGY AND CREATING A BIOTECHNOLOGY ENTERPRISE.

**BIOL-5405L      Advanced Techniques in Biotechnology Lab      0 Credits**  
LAB COURSE FOR BIOL-5405.

**BIOL-5413      Common Plants of Oklahoma      3 Credits**  
PLANT GROUPS OF GENERAL INTEREST TO THE LAYMAN, INCLUDING STUDY OF BASIC CHARACTERISTICS OF PLANT FAMILIES AND ENVIRONMENTAL FACTORS WHICH TEND TO LIMIT THEIR DISTRIBUTION TO CERTAIN PLANT COMMUNITIES. THIS COURSE IS DESIGNED PRIMARILY AS GENERAL EDUCATION FOR GRADUATES STUDENTS. LECTURE, LABORATORY, AND FIELD.

**BIOL-5414      Advanced Topics in Ecology      4 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF THE ECOSYSTEM INCLUDING A SURVEY OF AQUATIC AND TERRESTRIAL SYSTEMS. LECTURE, LAB AND FIELD STUDY.

**BIOL-5414L      Advanced Topics in Ecology Lab      0 Credits**  
LAB COURSE FOR BIOL-5414.

**BIOL-5424      Advanced Ethnobotany      4 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF PLANT USE BY PEOPLE, INCLUDING SUCH TOPICS AS MEDICINAL, SOCIETAL, CULTURAL, AND ECONOMIC USES OF PLANTS FROM PRE-HISTORY TO CURRENT. LECTURE AND LABORATORY.

**BIOL-5424L      Advanced Ethnobotany Lab      0 Credits**  
LAB COURSE FOR BIOL-5424.

**BIOL-5433      Human Genetics      3 Credits**  
A STUDY OF THE BASIC PRINCIPLES OF HUMAN GENETICS AND RELATED BIOLOGICAL PROBLEMS IMPORTANT TO OUR SOCIETY.

**BIOL-5525      Advanced Plant Ecophysiology      5 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF HOW PLANTS COPE WITH ENVIRONMENTAL STRESS THROUGH PHYSIOLOGICAL MECHANISMS AND INTEGRATION. WE WILL USE LECTURE, LAB AND FIELD TECHNIQUES TO EXPLORE PLANT-ENVIRONMENT INTERACTIONS. (THIS IS A FIELD COURSE.)

**BIOL-5525L      Advanced Plant Ecophysiology Lab      0 Credits**  
LAB COURSE FOR BIOL-5525.

**BIOL-5535      Advanced Plant Ecology      5 Credits**  
GRADUATE COURSE THAT EXPLORES TOPICS SUCH AS PLANT LIFE HISTORY TRAITS, DEMOGRAPHY, AND ABIOTIC AND BIOTIC INTERACTIONS. WE WILL USE LECTURE, DISCUSSION, LAB AND FIELD TECHNIQUES TO EXPLORE THE ECOLOGY OF PLANTS. (THIS IS A FIELD COURSE.)

**BIOL-5535L      Advanced Plant Ecology Lab      0 Credits**  
LAB COURSE FOR BIOL-5535.

**BIOL-5545      Advanced Molecular Biology      5 Credits**  
GRADUATE COURSE TO PROVIDE AN IN-DEPTH INVESTIGATION OF SPECIFIC ENZYMES AND REAGENTS THAT MODIFY NUCLEIC ACIDS BOTH IN VIVO AND IN VITRO. THE THEORY BEHIND BIOCHEMICAL ACTIVITY, OPTIMAL REACTION CONDITIONS AND PRACTICAL APPLICATIONS IN BIOENGINEERING WILL BE EXPLORED IN BOTH LECTURE AND LABORATORY. THE PRACTICAL PORTION OF THE COURSE WILL BE PROJECT DRIVEN AND WILL INCORPORATE ANALYSES OF THE CURRENT SCIENTIFIC LITERATURE.

**BIOL-5545L      Advanced Molecular Biology Lab      0 Credits**  
LAB COURSE FOR BIOL-5545.

**BIOL-5554      Genomics and Bioinformatics      4 Credits**  
ADVANCED STUDY AND ANALYSES OF GENOMES OF ALL THE GENES WITHIN A GENOME AND GENOMIC TECHNOLOGIES. TOPICS WILL INCLUDE TECHNIQUES AND METHODS IN GENETICS, GENOME SEQUENCING, METAGENOMICS, SEQUENCE ALIGNMENT, GENE AND PROTEIN ANALYSIS, -SEQ ANALYSIS, GWAS, MICROARRAY ANALYSIS, PROTEOMICS, DATABASE SEARCHING AND UNIQUE GENE ANNOTATION. LECTURE AND LABORATORY.

**BIOL-5554L      Genomics and Bioinformatics Lab      0 Credits**  
LAB COURSE FOR BIOL-5554.

**BIOL-5563      Pathogenic Microbiology      3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF BACTERIAL, FUNGAL, AND VIRAL DISEASES. IT WILL PRIMARILY COVER HUMAN DISEASES AND AGRICULTURALLY IMPORTANT DISEASES IN CROPS AND LIVESTOCK. ROUTES OF INFECTION SUCH AS AIR BORNE, WATER BORNE, FOOD BORNE, SOIL BORNE, ARTHROPOD BORNE, AND SEXUAL CONTACT WILL BE INVESTIGATED. CHARACTERISTICS OF INFECTIVE ORGANISMS AND THEIR MECHANISMS OF INFECTION IN DIFFERENT ORGANISMS WILL BE INCLUDED IN THE DISCUSSION.

**BIOL-5623      Medical Biochemistry      3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF THE BIOCHEMICAL AND MOLECULAR BASIS FOR HUMAN DISEASES. LECTURE TOPICS WILL INCLUDE METABOLIC DISEASES SUCH AS ATHEROSCLEROSIS AND DIABETES, AND THE BIOCHEMISTRY RELATED TO PRION DISEASES, VIROLOGY AND CANCER. EMPHASIS ON THE MUTATIONAL MECHANISMS LEADING TO DISEASE, MODELING DISEASE AND PERSONALIZED MOLECULAR TREATMENT OPTIONS INCLUDING GENOME EDITING.

**BIOL-5654      Histopathology      4 Credits**  
THE STUDY OF THE MICROANATOMY OF TISSUES AND ORGANS. AN INTRODUCTION TO MICROPHYSIOLOGY AND PATHOHISTOLOGY. LECTURE AND LABORATORY.

**BIOL-5654L      Histopathology Lab      0 Credits**  
LAB COURSE FOR BIOL-5654.

**BIOL-5683      Advanced Immunology      3 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF THE PRINCIPLES, MECHANISMS, AND CLINICAL APPLICATIONS OF THE IMMUNE RESPONSE.

**BIOL-5691      Thesis      1 Credit**  
ECUGRAD: VARIABLE CREDIT ONE TO THREE HOURS. MAY BE REPEATED FOR CREDIT; MAXIMUM CREDIT FOR NON-THESIS TRACK THREE HOURS; FOR THESIS TRACK SIX HOURS. STUDENTS WILL SELECT A THESIS COMMITTEE, CREATE A RESEARCH TOPIC, FORMULATE A PROPOSAL AND BIBLIOGRAPHY APPROVED BY THEIR COMMITTEE AND PERFORM RESEARCH ON THEIR TOPIC.

**BIOL-5691L      Thesis Lab      0 Credits**  
LAB COURSE FOR BIOL-5691.

**BIOL-5692      Thesis      2 Credits**  
ECUGRAD: VARIABLE CREDIT ONE TO THREE HOURS. MAY BE REPEATED FOR CREDIT; MAXIMUM CREDIT FOR NON-THESIS TRACK THREE HOURS; FOR THESIS TRACK SIX HOURS. STUDENTS WILL SELECT A THESIS COMMITTEE, CREATE A RESEARCH TOPIC, FORMULATE A PROPOSAL AND BIBLIOGRAPHY APPROVED BY THEIR COMMITTEE AND PERFORM RESEARCH ON THEIR TOPIC.

**BIOL-5692L      Thesis Lab      0 Credits**  
LAB COURSE FOR BIOL-5692.

**BIOL-5693      Thesis      3 Credits**  
ECUGRAD: VARIABLE CREDIT ONE TO THREE HOURS. MAY BE REPEATED FOR CREDIT; MAXIMUM CREDIT FOR NON-THESIS TRACK THREE HOURS; FOR THESIS TRACK SIX HOURS. STUDENTS WILL SELECT A THESIS COMMITTEE, CREATE A RESEARCH TOPIC, FORMULATE A PROPOSAL AND BIBLIOGRAPHY APPROVED BY THEIR COMMITTEE AND PERFORM RESEARCH ON THEIR TOPIC.

**BIOL-5693L      Thesis Lab      0 Credits**  
LAB COURSE FOR BIOL-5693.

**BIOL-5703      Advanced Biostatistics      3 Credits**  
ADVANCED STUDY OF STATISTICAL METHODS COMMONLY USED IN ENVIRONMENTAL AND LIFE SCIENCE. TOPICS INCLUDE DESCRIPTIVE AND INFERENCE STATISTICS AND OTHER RELATED CALCULATIONS. CREDIT CANNOT BE APPLIED FROM BOTH EH55703 AND BIOL5703.

**BIOL-5713      Teaching in the Sciences      3 Credits**  
SUPERVISED TEACHING AND CURRICULUM DEVELOPMENT WITHIN THE BIOLOGICAL SCIENCES FIELD. INTRODUCES GRADUATE STUDENTS TO A FULL RANGE OF TEACHING ROLES AND RESPONSIBILITIES RELATED TO INSTRUCTIONAL METHODS. SUPERVISED TEACHING AND CURRICULUM DEVELOPMENT WITHIN THE BIOLOGICAL SCIENCES FIELD. INTRODUCES GRADUATE STUDENTS TO A FULL RANGE OF TEACHING ROLES AND RESPONSIBILITIES RELATED TO INSTRUCTIONAL METHODS.

**BIOL-5773      Graduate Examination      3 Credits**  
IN COORDINATION WITH INSTRUCTOR, STUDENT WILL PREPARE AND SUCCESSFULLY COMPLETE GRADUATE EXAMINATION RELATED TO PLAN OF STUDY WITH WRITTEN EVALUATION FOR NON-THESIS TRACK AND ORAL EXAMINATIONS FOR THESIS TRACK GRADUATE STUDENTS. EXAMS COMPREHENSIVELY ASSESS FOR GRADUATE LEVEL ORGANIZED, LOGICAL AND CRITICAL THINKING SKILLS IN THE STUDENT TRACK TOPIC AREA.

**BIOL-5935      Advanced Limnology      5 Credits**  
GRADUATE COURSE TO PROVIDE AN UNDERSTANDING OF THE BASIC PHYSICAL, CHEMICAL, AND BIOLOGICAL CHARACTERISTICS OF FRESHWATER ECOSYSTEMS. EXPOSURE TO STANDARD FIELD SAMPLING AND DATA-COLLECTION PROCEDURES, AND THE ANALYSIS AND INTERPRETATION OF DATA FROM FRESHWATER ECOSYSTEMS. LECTURE AND LABORATORY AND FIELD WORK.

**BIOL-5935L      Advanced Limnology Lab      0 Credits**  
LAB COURSE FOR BIOL-5935.

**BIOL-5981      Seminar in Biology (Subject named in title listing)      1 Credit**  
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

**BIOL-5982      Seminar in Biology (Subject named in title listing)      2 Credits**  
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

**BIOL-5983      Seminar in Biology (Subject named in title listing)      3 Credits**  
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

**BIOL-5984      Seminar in Biology (Subject named in title listing)      4 Credits**  
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

**BIOL-5991      Individual Studies in Biology (Subject named in title listing)      1 Credit**  
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: 12 hours of Biology

**BIOL-5992      Individual Studies in Biology (Subject named in title listing)      2 Credits**  
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: 12 hours of Biology

**BIOL-5993      Individual Studies in Biology (Subject named in title listing)      3 Credits**  
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: 12 hours of Biology

**BIOL-5994      Individual Studies in Biology (Subject named in title listing)      4 Credits**  
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: 12 hours of Biology

**BIOL-H1114L      Honors-General Biology Laboratory      0 Credits**  
LAB COURSE FOR BIOL-H114.

**BIOL-H2344      Honors-General Microbiology      4 Credits**  
THE DISTRIBUTION, DISSEMINATION, CLASSIFICATION, AND IDENTIFICATION OF MICROORGANISMS, SPECIAL ATTENTION TO ORGANISMS CAUSING DISEASE AND TO IMMUNITY FROM THESE ORGANISMS. LECTURE AND LABORATORY. Required Previous: BIOL-1114

**BIOL-H2345      Honors-General Microbiology      5 Credits**  
THE DISTRIBUTION, DISSEMINATION, CLASSIFICATION, AND IDENTIFICATION OF MICROORGANISMS, SPECIAL ATTENTION TO ORGANISMS CAUSING DISEASE AND TO IMMUNITY FROM THESE ORGANISMS. LECTURE AND LABORATORY.

**BIOL-H2345L      Honors-General Microbiology Laboratory      0 Credits**  
LAB COURSE FOR BIOL-H2345.

**BIOL-H3134      Honors-Field Zoology      4 Credits**  
AN INTRODUCTION TO LOCAL ANIMAL LIFE BASED UPON CLASSIFICATION, DISTRIBUTION, AND NATURAL HISTORY OF REPRESENTATIVES OF THE ANIMAL PHyla OF THIS REGION. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314

**BIOL-H3245      Honors-Comparative Vertebrate Anatomy      5 Credits**  
COMPARISON OF ANATOMICAL STRUCTURE IN VERTEBRATE TYPES. LECTURE AND LABORATORY. Required Previous: BIOL-1314

**BIOL-H3343      Honors-Experimental Molecular Biology      3 Credits**  
A STUDY OF THE EXPERIMENTAL APPROACH AND TECHNIQUES USED IN MOLECULAR BIOLOGY. EMPHASIS WILL BE PLACED ON THE EXTRACTION, ISOLATION, AND PURIFICATION OF PROTEINS AND NUCLEIC ACIDS OF BACTERIA, FUNGI, PLANTS, AND ANIMALS. Required Previous: BIOL-1314

**BIOL-H3434      Honors-Genetics      4 Credits**  
A STUDY OF BASIC PRINCIPLES IN INHERITANCE INCLUDING MENDELISM AND MOLECULAR MECHANISMS AND RECOMBINANT DNA TECHNOLOGY. LECTURE AND LAB. Required Previous: BIOL-1214

**BIOL-H3434L      Honors-Genetics Laboratory      0 Credits**  
LAB COURSE FOR BIOL-3434.

**BIOL-H3553      HONORS-Genomics and Bioinformatics      3 Credits**  
INTRODUCTION TO THE STUDY AND ANALYSIS OF GENOMES AND THE FUNCTIONS AND RELATIONSHIPS (BROADLY INCLUDING BIOCHEMICAL ACTIVITY AND BIOLOGICAL FUNCTION) OF ALL THE GENES WITHIN A GENOME. TOPICS WILL INCLUDE TECHNIQUES AND METHODS IN GENETICS, GENOME SEQUENCING, SEQUENCE ALIGNMENT, GENE AND PROTEIN ANALYSIS, MICROARRAY ANALYSIS, PROTEOMICS AND DATABASE SEARCHING. Required Previous: BIOL-1214 or BIOL-1314

**BIOL-H3634      Honors-Human Physiology      4 Credits**  
FUNCTION OF THE HUMAN BODY, PHYSICAL AND CHEMICAL CHANGES WHICH OCCUR IN LIVING SYSTEMS. LABORATORY STUDIES IN THE PHYSICAL AND CHEMICAL NATURE OF ENERGY CHANGES OCCURRING IN LIVING SYSTEMS, AND THEIR EVALUATION UNDER VARIED CONDITIONS. LECTURE AND LABORATORY. Required Previous: BIOL-2184 OR BIOL-2344 OR BIOL-3245; Degree credit not allowed in both BIOL 3615 and 3634.

**BIOL-H3634L      Honors-Human Physiology Laboratory      0 Credits**  
LAB COURSE FOR BIOL-3634.

**BIOL-H3654      Honors-Histology      4 Credits**  
INTRODUCTION TO THE ESSENTIALS OF MICROANATOMY OF TISSUES AND ORGANS. LECTURE AND LABORATORY. Required Previous: BIOL-1314

**BIOL-H3654L      Honors-Histology Laboratory      0 Credits**  
LAB COURSE FOR BIOL-H3654.

**BIOL-H3683      Honors-Immunology      3 Credits**  
AN INTRODUCTORY STUDY OF THE PRINCIPLES, MECHANISMS, AND CLINICAL APPLICATIONS OF THE IMMUNE RESPONSE. Required Previous: BIOL-2344

<b>BIOL-H3934</b>	<b>Honors-Limnology</b>	<b>4 Credits</b>	<b>BIOL-H4994</b>	<b>Honors-Individual Studies in Biology (Subject named in title listing)</b>	<b>4 Credits</b>
INTRODUCTION TO THE STUDY OF FRESHWATER BIOLOGY, PHYSICAL AND CHEMICAL FACTORS, PLANKTON ANALYSIS, BOTTOM FAUNA LAKE AND STREAM MAPPING AND PRODUCTIVITY STUDIES. LECTURE AND LABORATORY. Required Previous: BIOL-1214			DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.		
<b>BIOL-H4113</b>	<b>Honors-Vertebrate Embryology</b>	<b>3 Credits</b>	<b>BIOL-S4981</b>	<b>Seminar in Biology (Subject named in title listing)</b>	<b>1 Credit</b>
OUTLINE OF FACTS AND FACTORS IN EMBRYONIC DEVELOPMENT OF FISHES, AMPHIBIANS, REPTILES, BIRDS AND MAMMALS. Required Previous: BIOL-1314			DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.		
<b>BIOL-H4214</b>	<b>Honors-Taxonomy of Flowering Plants</b>	<b>4 Credits</b>	<b>BIOL-S5981</b>	<b>Seminar in Biology (Subject named in title listing)</b>	<b>1 Credit</b>
IDENTIFICATION AND CLASSIFICATION OF PLANTS, ESPECIALLY OF THE LOCAL FLORA, CONSTRUCTION AND USE OF KEYS AND THE PREPARATION OF AN HERBARIUM. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1214			DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.		
<b>BIOL-H4214L</b>	<b>Honors-Taxonomy of Flowering Plants Laboratory</b>	<b>0 Credits</b>			
LAB COURSE FOR BIOL-H4214.					
<b>BIOL-H4313</b>	<b>Honors-Cell and Molecular Biology</b>	<b>3 Credits</b>			
CYTOLOGY, BIOCHEMISTRY, MOLECULAR REGULATION, AND FUNCTION OF CELLS AND ORGANELLES. EMPHASIS IS ON THE EUKARYOTIC CELL. Required Previous: Twelve hours of Biology					
<b>BIOL-H4414</b>	<b>Honors-Ecology</b>	<b>4 Credits</b>			
A STUDY OF THE STRUCTURE AND FUNCTION OF THE ECOSYSTEM INCLUDING A SURVEY OF THE AQUATIC AND TERRESTRIAL HABITATS. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314					
<b>BIOL-H4414L</b>	<b>Honors-Ecology Laboratory</b>	<b>0 Credits</b>			
LAB COURSE FOR BIOL-4414.					
<b>BIOL-H4534</b>	<b>Honors-Wildlife Management</b>	<b>4 Credits</b>			
THE APPLICATION OF SCIENTIFIC PRINCIPLES TO THE ECOLOGICAL PROBLEMS ASSOCIATED WITH THE MANAGEMENT OF WILDLIFE POPULATIONS AND THEIR HABITATS. LECTURE AND LABORATORY. Required Previous: BIOL-1214 or BIOL-1314					
<b>BIOL-H4614</b>	<b>Honors-Animal Parasitology</b>	<b>4 Credits</b>			
MORPHOLOGY, LIFE HISTORY, AND CLASSIFICATION OF THE MORE IMPORTANT PARASITES OF ANIMALS, HOST-PARASITE RELATIONSHIP AND METHODS OF CONTROL. LECTURE, LABORATORY, AND FIELD. Required Previous: BIOL-1314					
<b>BIOL-H4765</b>	<b>Honors-Molecular Genetics</b>	<b>5 Credits</b>			
A STUDY OF THE MOLECULAR MECHANISMS CONTROLLING GENE REGULATION AND DEVELOPMENT IN PROKARYOTIC AND EUKARYOTIC ORGANISMS. TECHNIQUES IN GENETIC ENGINEERING AND GENOMICS WILL BE INCLUDED IN BOTH LECTURE AND LABORATORY SESSIONS. SPECIAL TOPICS SUCH AS MOLECULAR GENETICS OF THE CELL CYCLE AND OF CANCER WILL BE COVERED.					
<b>BIOL-H4881</b>	<b>Honors-Biology Senior Seminar</b>	<b>1 Credit</b>			
DIRECTED STUDY ON BIOLOGICAL ACTIVITIES RELATED TO SENIOR LEVEL ASSESSMENT. (THIS COURSE SHOULD BE TAKEN DURING THE SEMESTER PRIOR TO GRADUATION.)					
<b>BIOL-H4983</b>	<b>Honors-Seminar in Biology (Subject named in title listing)</b>	<b>3 Credits</b>			
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.					
<b>BIOL-H4991</b>	<b>Honors-Individual Studies in Biology (Subject named in title listing)</b>	<b>1 Credit</b>			
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.					
<b>BIOL-H4992</b>	<b>Honors-Individual Studies in Biology (Subject named in title listing)</b>	<b>2 Credits</b>			
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.					
<b>BIOL-H4993</b>	<b>Honors-Individual Studies in Biology (Subject named in title listing)</b>	<b>3 Credits</b>			
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.					