

BIOLOGICAL SCIENCES

College of Arts and Sciences

BIOLOGICAL SCIENCES

MAJORS

- Clinical Laboratory Sciences
- Biology – with emphasis options in:
 - Botany
 - Cellular/Molecular
 - Ecology
 - Environmental Science
 - General Biology
 - Zoology
- Unified Science – Biology
- Biology Education
- Marine Biology
- Pre-professional Zoology – optional chiropractic emphasis
- Wildlife Ecology and Conservation
- Biology/Psychology
- Nanoscience

MINORS

- Biology
- Biology Education
- Interdisciplinary Minor in Environmental Science
- Middle School Science

TWO-YEAR PROGRAM

- Medical Administrative Assistant

THE DEPARTMENT

The Department of Biological Sciences offers quality undergraduate educational opportunities that provide students with a rich collegiate experience and the technical and intellectual skills necessary for competence in their chosen fields. Given the continuous technological advances being made, the department provides students with exposure to many of the scientifically based technological changes. The traditional classroom setting is complemented by laboratory classes and practical field experiences, which enable a student to put into immediate practice those concepts and understandings gained in the classroom.

The department stresses the importance of critical thinking to its students and emphasizes the ability of students to logically collect, collate, analyze and interpret information. These abilities, further strengthen the concept of the scientific theory. Students are encouraged to develop their methods of communication through the written and spoken word, the use of available technology and through visual means.

The department encourages undergraduates to become active in undergraduate research projects and thereby become creators and consumers of knowledge.

DEGREE PROGRAMS

The Department of Biological Sciences offers a wide range of programs leading to the Bachelor of Arts or Bachelor of Science degrees in the areas of biology, cell biology, environmental science, ecology, biology/psychology, marine biology, molecular biology, botany, zoology, pre-professional zoology, and wildlife ecology and conservation. The department also offers the biology endorsement of the Unified Science Major or Biology Education leading to a Bachelor of Science in Education degree. A Bachelor of Science in Clinical Laboratory Sciences is offered through the department in cooperation with approved schools at several medical centers. The affiliated medical centers are accredited through the National Accreditation Agency for Clinical Laboratory Sciences (NAACLS). Graduate programs leading to a Master of Science degree are also provided.

In addition to the various degree programs, the Department of Biological Sciences provides guidance and information in many areas of the life sciences. Specific non-degree, pre-professional programs for physical therapy, occupational therapy, respiratory therapy, physician's assistant, pharmacy, dental hygiene and others are offered. In cooperation with the Booth College of Business and Professional Studies, the department offers a two-year program for medical administrative assistants.

FACULTY ADVISEMENT

Each student is assigned a faculty advisor to assist in the selection of courses to complete their degree requirements.

MAJORS

CLINICAL LABORATORY SCIENCES

In conjunction with approved hospitals and medical centers.

The curriculum leading to the Bachelor of Science in Clinical Laboratory Sciences degree emphasizes biology and chemistry. Minimum academic prerequisites are established by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) and are taken on the Northwest campus during the first three years along with other courses required by the University. The fourth year (senior year) is a structured educational program in an affiliated clinical laboratory. The clinical program is accredited through NAACLS. Upon satisfactory completion of the clinical program, a minimum of 30 hours of credit are granted and the student is awarded a B.S. in Clinical Laboratory Sciences degree. Acceptance into an affiliated program is competitive and will be determined by the quality of academic work completed by the student during the first three years of study. Admission to the clinical program is decided entirely by the hospitals. *Acceptance into the University program does not guarantee acceptance of the student by an affiliated clinical program.*

HOSPITALS AND OFFICIALS IN ASSOCIATION WITH THE MEDICAL TECHNOLOGY DEGREE:

Des Moines, IA

- Mercy Medical Center

Kansas City, MO

- St. Luke's Hospital of Kansas City
- North Kansas City Memorial Hospital

B.S.

Required Courses

General Chemistry I and Laboratory
 General Biology and Laboratory
 General Microbiology
 Cell Biology OR Molecular Biology OR
 General Statistics I
 Human Physiology
 Genetics
 Immunology
 Clinical Laboratory Sciences program
 hours in conjunction with approved facility

Collateral Courses

General Chemistry II and Laboratory
 Quantitative Analysis and Laboratory
 Organic Chemistry I and Laboratory
 Elementary Biochemistry and Laboratory

Directed General Education Courses

College Algebra
 General Zoology and Laboratory
 General Physics II and Laboratory

BIOLOGY

B.S. – minor required

Areas of emphasis

- Botany
- Cellular/Molecular
- Ecology
- Environmental Science
- General Biology
- Zoology

This program is designed to give the student the opportunity to study in any of several areas of biology. The core courses are required of all students, and each area of emphasis has additional requirements specific for that emphasis.

Biology Core Courses

General Chemistry I and Laboratory
 General Zoology and Laboratory
 Cell Biology
 Genetics
 Basic Ecology
 Biological Science Seminar
 Biology Practicum

Required Collateral Areas

General Physics II and Laboratory
 General Chemistry II and Laboratory
 Organic Chemistry I and Laboratory

The following are required for Cellular/Molecular Emphasis:

Organic Chemistry II and Laboratory
 Elementary Biochemistry and Laboratory OR General Biochemistry and Laboratory

Directed General Education Courses

General Botany and Laboratory
 General Physics I and Laboratory
 College Algebra (*Calculus I replaces College Algebra for the Cellular/Molecular Emphasis*)

Required for the Botany emphasis

Biology Core
 Local Flora
 Principles of Taxonomy and Evolution
 Plant Anatomy and Morphology
 Plant Physiology
 Methods in Plant Ecology

Required courses for the Cellular/Molecular emphasis

Biology Core
 Microbiology
 Molecular Biology
 Immunology
 Plant Physiology OR Human Physiology

Required for the Ecology emphasis

Biology Core
 Local Flora
 Methods in Plant Ecology
 Methods in Animal Ecology
 One additional animal course above 300 level with advisor's consent
 General Earth Science and Laboratory OR General Geology and Laboratory OR Soils
 Advisor-approved biology electives above 300 level

**Required courses for
Environmental Science emphasis**

Biology Core
Methods in Plant Ecology OR Methods
in Animal Ecology
Environmental Issues
General Geology and Laboratory OR
General Earth Science and Laboratory

Choose six hours from the following:

Soils, Environmental Internship,
Wildlife Management and
Conservation, Quantitative
Analysis and Lab, Introduction
to Hydrogeology, Environmental
Geology, Geochemistry, Environmental
Regulations, Other advisor-approved
electives

**Required courses for
General Biology emphasis**

Biology Core
As equal a number of hours as possible
in plant and animal biology are to be
selected with the advice and consent of
the advisor.

**The following courses may be
counted either as animal or plant
courses:**

Microbiology
Principles of Taxonomy and Evolution
Environmental Issues
Molecular Biology
Wildlife Management and
Conservation

Required courses for Zoology emphasis

Biology Core
Invertebrate Zoology
Comparative Anatomy
Biology Electives: Animal Anatomy and
Physiology, Mammalogy, Ornithology,
Entomology, Vertebrate Histology,
Human Anatomy, Human Physiology,
Herpetology, Wildlife Management
and Conservation, Methods in Plant
Ecology, Methods in Animal Ecology

**UNIFIED SCIENCE MAJOR IN
BIOLOGY**

*B.S. Ed. – no minor required; certifies
grades 9-12, endorsement area: Biology*
**Required Courses in Endorsement Area:
Biology**

General Zoology and Laboratory
Animal Anatomy and Physiology
General Microbiology
Cell Biology
Genetics
Principles of Taxonomy and Evolution
Problems in General Biology OR
Problems in Biological Education
Biological Science Seminar
Environmental Issues
Biology Practicum
General Chemistry I and Laboratory

**Required Collateral Courses for the
Unified Science Major**

History of Science and Technology
General Chemistry II and Laboratory
Organic Chemistry and Laboratory OR
Organic Chemistry I and Laboratory
General Physics I and Laboratory
General Physics II and Laboratory
Historical Geology
Trigonometry

Directed General Education Courses

General Botany and Laboratory
College Algebra
General Earth Science and Laboratory

Professional Education Requirement

Methods in Secondary School Science

BIOLOGY EDUCATION

*B.S. Ed. – no minor required;
certifies grades 9-12*

Required Courses

General Chemistry I and Laboratory
General Zoology and Laboratory
General Microbiology
Cell Biology
Genetics
Principles of Taxonomy and Evolution
Environmental Issues
Biology Practicum
Problems in General Biology OR
Problems in Biology Education
Biological Science Seminar
Animal Anatomy and Physiology
OR Plant Physiology OR Human
Physiology
General Chemistry II and Laboratory
Organic Chemistry I and Laboratory
Elementary Biochemistry and Laboratory
OR General Biochemistry and
Laboratory
History of Science and Technology
General Physics I and Laboratory OR
General Physics II and Laboratory

Directed General Education Courses

College Algebra
General Botany and Laboratory
General Earth Science and Laboratory

Professional Education Requirement

Methods in Secondary School Science

MARINE BIOLOGY*B.S. – no minor required***Required Courses**

General Zoology and Laboratory
 Cell Biology
 Invertebrate Zoology
 Genetics
 Marine Science I: Oceanography
 Marine Science I Lab
 Marine Science II: Marine Biology
 Marine Science II Lab
 Basic Ecology
 Biology Practicum
 Biological Science Seminar

Collateral Courses

General Statistics I
 General Chemistry II and Laboratory
 Organic Chemistry I and Laboratory
 General Physics I and Laboratory
 General Physics II and Laboratory
 Geographic Information Systems

Directed General Education Courses

General Botany and Laboratory
 College Algebra OR Calculus I
 General Chemistry I and Laboratory

Approved electives above 300 level

PRE-PROFESSIONAL ZOOLOGY*B.S. – no minor required***Required Courses**

General Chemistry I and Laboratory
 General Zoology and Laboratory
 General Microbiology
 Comparative Anatomy
 Genetics
 Vertebrate Histology
 Human Physiology
 Cell Biology
 Immunology
 Biological Science Seminar

Collateral Courses

General Chemistry II and Laboratory
 Organic Chemistry I and Laboratory
 Organic Chemistry II and Laboratory
 Elementary Biochemistry OR General Biochemistry
 General Physics II and Laboratory

Directed General Education Courses

College Algebra
 General Botany and Laboratory
 General Physics I and Laboratory

**PRE-PROFESSIONAL ZOOLOGY-
CHIROPRACTIC EMPHASIS***B.S. – no minor required***Required Courses**

General Zoology and Laboratory
 Genetics
 Human Anatomy
 Human Physiology

Collateral Courses

General Chemistry I and Laboratory
 General Chemistry II and Laboratory
 Organic Chemistry I and Laboratory
 Organic Chemistry II and Laboratory

Courses taken at approved chiropractic schools

Biochemistry I and Laboratory
 General Microbiology
 Vertebrate Histology
 Gross Anatomy I
 Neuroanatomy

Directed General Education Courses

College Algebra
 General Botany and Laboratory
 General Physics I and Laboratory

**WILDLIFE ECOLOGY AND
CONSERVATION***B.S. or B.A. – no minor required***Required Courses**

General Chemistry I and Laboratory
 General Zoology and Laboratory
 Animal Anatomy and Physiology
 Soils
 Local Flora
 Entomology
 Invertebrate Zoology
 Genetics
 Mammalogy
 Ornithology
 Basic Ecology
 Herpetology
 Wildlife Management and Conservation
 Biological Science Seminar
 Methods in Plant Ecology (B.S. only)
 Methods in Animal Ecology (B.S. only)

Collateral Courses

General Chemistry II and Laboratory
 Geographic Information Systems
 Woody Landscape Plants
 General Statistics I

Directed General Education Courses

College Algebra
 General Botany and Laboratory
 General Physics I and Laboratory OR
 General Physics II and Laboratory

BIOLOGY/PSYCHOLOGY

This major allows students to complete individual programs of study arranged by advisors in both the Biology and Psychology/Sociology/Counseling departments. These programs provide excellent preparation for a career/post-graduate training of an interdisciplinary nature. While requiring students to complete half their classwork as advised by each department, this program allows students the flexibility to tailor the major to their individual and specific academic needs. We urge students to see advisors in both departments at an early date to contract a program of study.

Required Courses for Psychology

Abnormal Psychology
 Developmental Psychology
 Biological Psychology
 Advanced Biological Psychology
 Psychology of Groups and Teams
 Electives as determined and approved by the psychology advisor

Required Courses for Biology

General Zoology and Laboratory
 Genetics
 Biological Science Seminar
 General Chemistry I and Laboratory
 General Chemistry II and Laboratory

Choose one of the following:

General Physics I and Laboratory OR
 General Physics II and Laboratory
 OR Organic Chemistry and
 Laboratory OR Organic Chemistry I
 and Laboratory

Electives as determined and approved by the biology advisor

Directed General Education Courses

General Psychology
 College Algebra
 General Botany and Laboratory
 General Physics I and Laboratory OR
 General Physics II and Laboratory

NANOSCIENCE

This is an interdisciplinary major in conjunction with the Departments of Biological Sciences, Chemistry and Physics, and Mathematics and Statistics. Three emphasis areas are available for this major: Nanoscale Biology, Nanoscale Chemistry and Nanoscale Physics.

Required Core Courses

Microbiology
Cell Biology
Genetics
Molecular Biology
General Statistics I
Calculus II
General Chemistry I and Laboratory
General Chemistry II and Laboratory
Laboratory Safety
Organic Chemistry I and Laboratory
Biochemistry and Laboratory
Classical Physics II and Laboratory
Nanoscale Science I
Nanoscale Science II

Nanoscale Biology Emphasis Required Courses

Immunology
Techniques in Biotechnology
Organic Chemistry II and Laboratory
Macromolecular Structures

Directed General Education Courses

General Botany and Laboratory
Calculus I
Classical Physics I and Laboratory
Introduction to Ethics

MINORS

BIOLOGY

B.S. or B.A.

Required Courses

General Botany and Laboratory
General Zoology and Laboratory
Genetics
Biological Science Seminar
General Chemistry I and Laboratory
Approved biology electives (two hours must be at 300 level)

BIOLOGY EDUCATION

B.S. Ed. – certifies grades 9-12

Required Courses

General Botany and Laboratory
General Zoology and Laboratory
General Microbiology
Animal Anatomy and Physiology
Cell Biology
Genetics
Principles of Taxonomy and Evolution
Biology Practicum
History of Science Technology

Professional Education Requirements

Methods in Secondary School Science

INTERDISCIPLINARY MINOR IN ENVIRONMENTAL SCIENCE

Required Courses

General Chemistry I and Laboratory
General Zoology and Laboratory
Basic Ecology
Environmental Geology OR
Environmental Issues
Hydrogeology
Conservation of Natural Resources

Advisor-approved electives (choose four hours)

Soils, General Microbiology, Environmental Internship, Wildlife Management and Conservation, Methods in Plant Ecology, Methods in Animal Ecology, Geochemistry, Environmental Regulations, Sedimentology, Climatology, other courses as approved by the advisor.

Directed General Education Courses

General Botany and Laboratory
General Earth Science and Laboratory

MIDDLE SCHOOL SCIENCE

B.S. Ed., major in Middle School (certifies grades 5-9); additional concentration area is required

Required Courses

General Botany and Laboratory OR
General Zoology and Laboratory
General Earth Science and Laboratory
Descriptive Astronomy and Laboratory
The Physical Sciences and Laboratory
General Chemistry I and Laboratory OR
General Physics I and Laboratory OR
General Physics II and Laboratory
Laboratory Safety
History of Science and Technology

Directed General Education Courses

General Biology and Laboratory

Professional Education Requirements

Methods in Middle School Science

TWO-YEAR PROGRAM

MEDICAL ADMINISTRATIVE ASSISTANT

Two-year curriculum

Required Courses

Freshman Seminar
Composition OR Honors Composition
General Biology and Laboratory
Medical Terminology
General Zoology and Laboratory
General Microbiology
Human Anatomy
General Chemistry I and Laboratory
College Algebra
Computers and Information Technology
Spreadsheet Applications
Advanced Spreadsheets and Charting
DigiTools
Advanced Word Processing
Presentation Graphics
Digital Media
Virtual Workplace
Database Applications
Accounting I
Managerial Communications
Principles of Management

Choose three hours from the following

Web Development, Medical Transcription and Medical Records, Business Law, General Psychology

COURSE DESCRIPTIONS

BIOLOGY

General Biology

A general course in biology which provides students a broad understanding of the basic principles of biological science such as cells, energy production, photosynthesis, genetics, plant and animal physiology, ecology and diversity. Upon completion, students should be able to understand the intricate relationship between living organisms and their environment and more intelligently act upon important issues facing our society.

General Biology Laboratory

A two-hour laboratory which must be taken concurrently with General Biology.

Medical Terminology

Medical terms encountered in the anatomy, physiology and surgical procedures of the life support systems.

Theory and Practice of Emergency Medical Techniques

Theory and clinical practice which allows one to gain and apply knowledge about the life support systems encountered in emergency medical situations. Students will be presented symptoms, treatment, practical experience and use of emergency medical equipment. This course is approved and partially funded by the Missouri Bureau of Emergency Medical Services.

Emergency Medical Techniques

A brief refresher of Theory and Practice of Emergency Medical Techniques which serves as a refresher course for those seeking to be re-licensed as emergency medical technicians. Funded in part by the Missouri Bureau of Emergency Medical Services.

General Botany

A fundamental study of plants: life histories, structure, physiology, ecology and economic importance.

General Botany Laboratory

A two-hour laboratory which must be taken concurrently with General Botany.

General Zoology

Introduction to animal life including life histories, structure, functions and reproduction.

General Zoology Laboratory

Two-hour laboratory which must be taken concurrently with General Zoology.

Animal Anatomy and Physiology

A study of the basic physiological functions and anatomical concepts of the primary systems of the animal body.

General Microbiology

A study of the morphology, physiology and culturing of microorganisms. Studies on disease-producing organisms, the fundamentals of immunology, various laboratory techniques, and procedures and the applications of microbiology will be included.

Current Topics in Biology

Each current topic is specifically designed to address a timely topic in biology.

Local Flora

A two-hour laboratory course designed to acquaint the student with plants of this region and their classification.

Medical Transcription and Medical Records Practicum

The practicum consists of the American Medical Association's Medical Transcription Course which is a programmed study and directed practice in the medical records department. The directed practice includes experiences in admitting procedures, dismissing procedures, insurance forms, coding diseases and operations, medical record completion (inspecting charts for deficiencies), filing and computer data processing form completion.

Pre-Professional Health Science Internship

Each student will be supervised and be an active participant in an area of health care. A professional paper describing the supervised experience will be required.

Wildlife Ecology and Conservation Internship

Each student will be supervised and be an active participant in an area of wildlife ecology or conservation. A professional paper describing the supervised experience will be required, along with a program given to the department's 102 River Wildlife Club. May be repeated for a maximum of nine credit hours.

Undergraduate Research in Biology

This course is designed to allow students to become involved in undergraduate research projects directed by a departmental faculty member. The student will develop the project, write the proposal and present the results at a local, state or national meeting.

Environmental Internship

Students will be placed in a work setting and become an active participant in an environmental area. Sixty-four hours of on-site work plus a written report will be required.

Cell Biology

An introduction to the fundamentals of cellular structure and function. Cell physiology, molecular biology, cellular organelles, energy relationships and reproduction of cells are included. Three hours of lecture and three hours of laboratory per week.

Invertebrate Zoology

A systematic treatment of major invertebrate phyla, classes and other groups, including taxonomic, anatomical, physiological, embryological and ecological features.

Principles of Taxonomy and Evolution

A study of the origin and diversity of life as well as both animal and plant classifications. Studies include contemporary systematic approaches, construction of keys, international rules of nomenclature, evolutionary principles, and origin of species. Two hours of lecture and four hours of laboratory per week.

Comparative Anatomy

The comparative anatomical evolution of the vertebrates. Laboratory consists of dissection of various vertebrates.

Genetics

An introduction to the fundamental facts and principles of inheritance including the physical, biochemical and cytological bases for Mendelian inheritance, selection and breeding, probability and human genetics. Two hours of lecture and two hours of laboratory per week.

Mammalogy

A study of mammals with emphasis upon their classification, identification, evolution, life histories, ecology, habits, anatomy, physiology, aesthetic and economic values.

Ornithology

A study of the habitats, life histories, structure, functions, evolution, ecology, classification and identification of the birds found primarily in this region, with emphasis upon their economic and aesthetic values to man.

Entomology

An introduction to the world of insects: their structure and function, numbers, classification, life history, behavior, ecology and their relationship to humans.

Basic Ecology

A basic study in ecological field techniques and ecological theory.

Biology Practicum

Instruction and practical experience in development, teaching and the preparation of introductory biology laboratories.

Plant Anatomy and Morphology

A study of the development, structure and function of plant tissues and organs, as well as the form and structure of extinct plant groups found in the fossil record. Primary emphasis on vegetative and reproductive organs of gymnosperms and angiosperms.

Vertebrate Histology

The study of vertebrate tissues and organs. Laboratory consists of a microscopic study of cells, tissues, organs and organ systems.

Environmental Issues

An overview of the science, politics and sociology of current environmental issues, including pollution, wastes, ozone depletion, acidic precipitation, greenhouse effect, deforestation, water use, energy and population.

Plant Physiology

A study of the chemical and physical processes involved in the growth and functioning of plants.

Human Anatomy

The systematic study of human anatomy, including the skeletal, muscular, cardiovascular, digestive, respiratory, urinary, endocrine, reproductive, and integumentary systems.

Human Physiology

The study of the physiological processes of humans, including membranes, muscle, nervous, cardiovascular, respiratory, renal, gastrointestinal, endocrine and reproductive physiology.

Molecular Biology

An advanced course that explores the molecular structures, processes, and regulatory mechanisms related to DNA, RNA, protein expression and function.

Immunology

Principles of immunology: to include antigen-antibody relationships, host-antigen interaction, immunocytology, humoral and cellular response mechanisms, and serologic reactions.

Herpetology

Anatomy, physiology, taxonomy, distribution, life history and ecology of amphibians and reptiles, emphasizing those in Missouri.

Readings in Ecology

Directed reading in ecology. Designed to acquaint the student with both historical and current developments in animal and plant ecology.

Wildlife Management and Conservation

A course designed to apply field and laboratory techniques to the management of game and nongame wildlife resources; management emphasis will entail conservation practices with consideration for threatened, rare and endangered species. Professionally written papers are required.

Readings in Molecular Biology

Directed readings in advances and techniques in molecular biology.

Advanced Biology Practicum

An advanced course in practical procedures of instruction and preparation in biological laboratories. A maximum of two semester hours in advanced biology practicum courses is allowed.

Biological Science Seminar

Individual reports and group discussion of problems and current research in biological sciences. May be repeated for additional credit; maximum two semester hours.

Current Topics in Biology

Each current topic is specifically designed to address a timely topic in biology.

Techniques in Biotechnology

A studio course dedicated to hands-on experience with common techniques utilized in the field of biotechnology. Theory and practical experience will be provided for techniques in DNA isolation, manipulation, gene cloning, library screening, molecular detection, and protein expression.

Genetic Modifications of Biotechnology Feedstocks

Classical and modern techniques in genetic improvement of plant species with an emphasis on industrially important chemicals or products.

Genetic Modifications of Biotechnology Feedstocks Laboratory

Classical and modern techniques in genetic improvement of plant species on industrially important chemicals or products.

Methods in Plant Ecology

This course surveys field techniques for collection of data and analysis of plant communities. Emphasis is placed on methods of analysis of the plant community.

Methods in Animal Ecology

This course will apply field techniques for the collection of data and analysis of animal communities. Emphasis is on methods of analysis and preparation of an environmental assessment of two animal communities. Four hours of laboratory per week.

CLINICAL LABORATORY SCIENCES

The following senior-level courses are taken by students in a hospital clinical laboratory internship program. They are taught by the hospitals' schools of clinical laboratory sciences. They are not offered on campus by Northwest Missouri State University.

Clinical Microbiology

The theory and laboratory study of pathogenic bacteria, viruses, rickettsiae, fungi and parasites. Includes specimen handling, methods of isolation, cultivation, diagnostic procedures, asepsis, environmental monitoring, medical significance and quality control.

Clinical Chemistry

Identification and quantitation of specific chemical substances in blood and body fluids by various analytical techniques, clinical correlation with diagnosis and treatment of disease, principles of instrumentation, toxicology, and quality control.

Clinical Hematology

Theory of blood cell formation, morphology of cellular constituents, disease states, homeostasis and coagulation testing. Techniques and instrumentation used to determine major hematological and clotting parameters will be included, along with quality control procedures.

Clinical Immunohematology

A study of the common blood group systems, principles and procedures for antigen-antibody detection, cross-matching, blood collection and preservation, the evaluation of transfusion reaction(s), clinical correlation of abnormalities and quality control.

Clinical Immunology

Covers characteristics of antigen-antibody function and interaction, principles and procedures of humoral and cellular immune responses, performances of serological procedures, clinical correlation of abnormalities and quality control.

Clinical Urinalysis (Microscopy)

A study of renal physiology and function in healthy and diseased states. Includes chemical and microscopic examination of urine, other excreta, and body fluids in relation to disease processes, along with quality control procedures.

Topics in Medical Technology

Subject matter may include the following: hospital orientation, laboratory management, radioisotope techniques, laboratory safety, special projects, special techniques, quality control procedures and seminars on various subjects deemed necessary by hospital personnel.

GULF COAST RESEARCH

The following courses are not taught on the Northwest campus, but at the accredited Gulf Coast Research Center.

Marine Science I: Oceanography

An introductory course in oceanography which integrates chemical, geological and physical oceanography to provide fundamentals of oceanography at Gulf Coast Research Laboratory.

Marine Science II: Marine Biology

A general introduction to marine biology with emphasis on local fauna and flora at Gulf Coast Research Laboratory.

Marine Science Lab I

Field and laboratory exercises that accompany Marine Science I, consisting of various sampling techniques, analytical methods, data analyses, chart reading, and shipboard procedures.

Marine Science Lab II

Field and laboratory exercises that accompany Marine Science II, consisting of various sampling techniques, species identification, data analyses, chart reading, and shipboard procedures.

Marine Botany

A survey based upon local examples of the principal groups of the marine algae and marine flowering plants, treating structure, reproduction, distribution, identification and ecology at Gulf Coast Research Laboratory.

Marine Microbiology

Microbiology and advanced microbiology students are introduced to the role of the microorganisms in the overall ecology of oceans and estuaries at Gulf Coast Research Laboratory.

NANOSCALE SCIENCE

Nanoscale Science I

A course dedicated to the interface of chemistry and physics at the nanometer scale. Topics will focus on the relationship between nanoscale structure and macroscopic properties, nanoscale instrumentation and characterization, creation of materials and devices, and the role and perception of nanotechnology in society.

Nanoscale Science II

A course dedicated to the interface of biology and physics at the nanometer scale. Topics will focus on the application of physical concepts to biological systems in the developing field of nanobiotechnology.

UNDERGRADUATE RESEARCH

Most Northwest students have the opportunity to research (with pay) between their junior and senior years. Students have interned at places like these:

- Argonne National Laboratories
- Iowa State University
- University of Nebraska
- University of Nebraska Medical Center

CAREER OPPORTUNITIES

The options for careers are too numerous to name. The following is a short list of some of the jobs our graduates have found.

- Conservation Agent
- Consultant
- Ecologist
- Environmentalist
- Food Scientist
- Naturalist
- Peace Corps Volunteer
- Plant Ecologist
- Plant Geneticist
- Public School Teacher
- Scientific Writer
- Wildlife Biologist
- Zoos and Museums

STUDENT ORGANIZATIONS

Of our undergraduate students, many are involved in one or more extracurricular activities. There are plenty of options to get involved outside the classroom including:

- 102 River Wildlife Club
- Beta Beta Beta biology honor society
- Pre-Medical Professionals Club

SCHOLARSHIPS

The Department offers several scholarships, including several available for freshmen who have declared a biology major. For more information, please contact the Department or the Office of Financial Assistance at (660) 562-1363 or visit Northwest's Web site.

William T. Garrett Scholarship

Sophomore biology major with zoology emphasis. Financial need considered.

Dr. Richard A Hart Scholarship

Biology major.

Dr. Irene Mueller Scholarship

Biology major with more than 45 credit hours (and more than 12 in biology) and GPA of 3.00 or higher.

Fred & Grace Nelson Scholarship

Junior or senior biology major with pre-medical or pre-dental career goal. Financial need considered.

Luke C. Palumbo Memorial Scholarship

Biology education major.

Mark Patton Memorial Scholarship

Biology major with wildlife ecology and conservation emphasis.

Mark B. Robbins Wildlife Ecology & Conservation Scholarship

Biology major with wildlife ecology and conservation emphasis.

B.D. and Janet Scott Biology Scholarship

Junior or senior biology major with more than 60 credit hour and GPA of 3.00 or higher. Financial need considered.

DEPARTMENT OF BIOLOGICAL SCIENCES

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