

## Biological Sciences

### BL 0600 - Clinical Practicum and Career Preparation Seminar

Presents an overview of hospital-based clinical practicum experiences and outlines pathways to national certification. Also addresses other career options for the clinical laboratory scientist. Credits do not count toward graduation.

**Credits:** 1.0; Graded Pass/Fail Only

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science; May not be enrolled in one of the following Class(es): Freshman

### BL 1010 - General Biology I

A discussion of the principles of ecology and organismal biology, using the theme of physiological ecology and adaptations. This course will emphasize biodiversity, scientific method, experimental design and written and oral presentation of results.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences

### BL 1020 - General Biology II

Discussion of the major principles by which life is organized. Topics include scientific methods, biological chemistry, cell structure and organization, multicellular organization, diversity of organisms, energetics and photosynthesis, cellular reproduction genetics, gene structure and expression, and recombinant DNA.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences

**Pre-Requisite(s):** BL 1010

### BL 1040 - Principles of Biology

Basic principles through which biological systems operate. Topics include cell biology, structure, and function, energy production, genetics, physiology, diversity, evolution, and ecology.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-2)

**Semesters Offered:** Fall, Summer

**Restrictions:** May not be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences

### BL 1580 - Introduction to Biological Sciences

Introduction to fields and career opportunities in the biological sciences.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

### BL 1590 - Introduction to Pre-Medicine

Introduction to various careers in the medical field. Discusses required course work, entrance exams, and other requirements for entry to the various fields. Guest lecturers include representatives of many medical fields.

**Credits:** 1.0

**Lec-Rec-Lab:** (1-0-0)

**Semesters Offered:** Fall

### BL 1600 - Introduction to Clinical Laboratory Science

Introduction to subdisciplines, the clinical practicum, career opportunities, and current issues in clinical laboratory science.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

### BL 1710 - Medical Terminology

Autotutorial course covers the fundamentals of medical terminology, including recognition and use of common prefixes, roots, and suffixes, as well as single-syllable words. Exercises also include spelling and pronunciation.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

### BL 1800 - Biochemistry Orientation

Introduction to current research and career opportunities in biochemistry with emphasis on the interdisciplinary nature of the field.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following College(s): College of Sciences & Arts

### BL 1900 - Molecular Biology Seminar

Discussion of current molecular topics in modern biology. Topics include applications in medicine and agriculture, gene therapy, genetically modified organisms, cloning, stem cells, use of these problem solving techniques in forensics and genetic disease, ethics.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

### BL 2010 - Anatomy & Physiology I

Comprehensive introductory course in vertebrate anatomy and physiology with emphasis on the human body. Interrelates structure with function in regard to maintaining homeostasis and normal functioning of the body. Covers the integument, skeletal system, nervous system, muscles, and the endocrine system.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Pre-Requisite(s):** CH 1100 or CH 1110 or CH 1112 or (CH 1150 and CH 1151 and CH 1153)

### BL 2011 - Anatomy & Physiology I Lab

The laboratory to accompany BL2010. Examines embryology, muscle and skeletal anatomy, and neuroanatomy. Explores the physiology of the nervous system, including vision and reflexes and muscle physiology. A student-designed lab project is used to teach experimental design.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall

**Pre-Requisite(s):** BL 2010(C)

### BL 2020 - Anatomy & Physiology II

Continuation of BL2010. Covers the cardiovascular, respiratory, digestive, renal, and reproductive systems.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 2010

### BL 2021 - Anatomy & Physiology II Lab

The laboratory to accompany BL2020. Examines the structure and function of the digestive, respiratory, cardiovascular, and renal systems. A student-designed lab project is used to teach experimental design.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 2011 and BL 2020(C)

### BL 2100 - Principles of Biochemistry

Introductory overview to biochemistry. Topics include the biochemistry of amino acids, proteins, coenzymes, carbohydrates, nucleotides, nucleic acids, lipids, and water, as well as bioenergetics and photosynthesis.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall, Summer

**Pre-Requisite(s):** BL 1020 or BL 1040 or BE 2400 or BL 2400 and (CH 1100 or CH 1110 or CH 1112) or (CH 1150 and CH 1151 and CH 1153)

### BL 2160 - Botany

Covers structure, function, reproduction, and classification of plants and algae, relating these current ecological, agricultural, or other human issues.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Spring

### BL 2170 - Zoology

A discussion of the biology of animals, including the origins and evolution of the metazoan phyla, their physiology, development, ecology, behavior, natural history, and systematics. Emphasizes invertebrates other than insects.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Fall

**Pre-Requisite(s):** BL 1010 or BL 1040

**BL 2200 - Genetics**

A study of classical and molecular genetics. Topics include one- and two-locus genetics, recombination, gene structure, regulation and function, quantitative and population genetics, and genetic engineering. Covers both prokaryotes and eukaryotes.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** (BL 1020 or BL 1040) and (BL 2100 or CH 4710)

**BL 2210 - Genetics Laboratory**

A laboratory to complement BL2200. Covers applications of techniques used in genetics, including Mendelian analysis, tetrad analysis, karyotyping, DNA and protein electrophoresis, DNA and plasmid purification, transformation and restriction mapping, and PCR amplification of DNA.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 2200(C)

**BL 2400 - Biology for Engineers I**

General principles and engineering applications of science and biology, including cell biology, physiology, molecular biology, genetics, and biotechnology.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Level(s): Graduate; May not be enrolled in one of the following Class(es): Senior

**BL 2410 - Basic Clinical Laboratory Techniques**

Introduces a variety of fundamental diagnostic procedures performed in a typical clinical laboratory.

**Credits:** 3.0

**Lec-Rec-Lab:** (2-0-3)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences; May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** BL 1020 and BL 1710

**BL 2940 - Human Nutrition**

Covers basic and applied chemistry and biology of human nutrition. Includes practical information on planning and adopting a healthy diet as well as maintaining acceptable weight. Emphasizes social, global, and environmental issues pertinent to use of the world food supply.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** UN 2002

**BL 3070 - Biology & Occupational Hygiene**

The first third of this course will cover fundamentals of cellular and organismal biology. The remainder of the course covers the toxic effects of occupational chemicals, energy forms and industrial pollutants on human tissue. Emphasizes recognition, evaluation, and control of health hazards in the workplace.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-3-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** CH 1140 or CH 2400 or (CH 2410 and CH 2420)

**BL 3190 - Evolution**

A study of the patterns and processes of organic evolution. Topics include genetics of populations, mechanisms of deterministic and stochastic genetic change, history of life on earth, biogeography, molecular evolution, units of selection, sexual selection, speciation, and human evolution.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 1020 or BL 1040

**BL 3210 - General Microbiology**

Introduction to the general principles and techniques involved in the study of microorganisms, including bacteria, fungi, and viruses. Topics include cell structure and function, growth, metabolism, biodiversity, and interactions.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** (BL 1020 or BL 1040) and (BL 2100 or CH 4710)

**BL 3230 - Medical Bacteriology**

Study of pathology, identification, isolation and antimicrobial susceptibility testing of clinically important bacteria.

**Credits:** 4.0

**Lec-Rec-Lab:** (2-0-5)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 3210

**BL 3300 - Introduction to Genomics**

Introduction to Genomics. Genome organization, mapping and characterization from humans and related organisms. Topics include hierarchical arrangement of genes, genome mapping, molecular markers of physical genome maps, genome sequencing, comparative genomics, analysis of important human genes and their products, and ethical and legal aspects of genomics.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** BL 2200

**BL 3310 - Environmental Microbiology**

General principles of microbiology, focusing on both the use and control of microorganisms. Topics include microbial structure, function, growth, metabolism, and diversity, as well as microbial involvement in water and waste treatment, waterborne diseases, and pollution control.

**Credits:** 3.0

**Lec-Rec-Lab:** (2-0-3)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 1040 or BL 3070

**BL 3400 - Principles of Ecology**

Study of both accepted and currently debated principles that describe ecological relationships at the organism, population, community, and ecosystem levels.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Fall

**Pre-Requisite(s):** BL 1020 or BL 1040

**BL 3640 - General Immunology**

Investigates the immune defense system that has evolved to protect vertebrates from invading pathogens and cancer. Covers general principals of innate and acquired immunity, immunodeficiency and autoimmune diseases, as well as transplantation immunology, and the role of apoptosis in lymphocyte maturation.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Biochem & Molec Biology-Bio Sc, Biological Sciences, Clinical Laboratory Science, Biomedical Engineering, Bioinformatics; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 1020 or BL 1040 or BL 2020

**BL 3780 - Medical Parasitology Laboratory**

Stresses the visual identification of common human parasites.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 1710 and BL 2410

**BL 3970 - Current Health Issues**

Current topics relevant to human health, with emphasis on health maintenance and disease prevention and the role of government in these matters. Topics include: tobacco use and poor diet/physical inactivity, infectious disease, mental and behavioral health, environmental health issues, and health care, including health insurance and models of universal health coverage.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** UN 2002

**BL 3990 - Biological Sciences Teaching Experience**

Development of teaching skills through assisting in the instruction of a section of biological sciences laboratory. Students gain experience in leadership, group work, organization skills, laboratory preparation, and laboratory instruction.

**Credits:** variable to 4.0; Repeatable to a Max of 4

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Permission of instructor required

**BL 4000 - Special Problems in Biology**

A literature and laboratory research problem that culminates in a written report on the work performed.

**Credits:** variable to 9.0; Repeatable to a Max of 9

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Permission of instructor required

**BL 4001 - Honors Research in Biology**

A laboratory-based research problem that culminates in a written report and a seminar presentation on the work performed. Open only to biological sciences and clinical laboratory sciences majors accepted into the Honors in Biological Sciences program.

**Credits:** variable to 9.0; Repeatable to a Max of 9

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Major(s): Biological Sciences, Clinical Laboratory Science, Bioinformatics

**BL 4010 - Biochemistry I**

Structure, biochemical properties, and function of important biomolecules such as proteins and nucleic acids. Introduces enzyme biochemistry (structure, function, catalysis, kinetics, and inhibition).

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Pre-Requisite(s):** (BL 1020 or BL 1040 or BL 2010) and BL 2100 and (CH 2400 or CH 2420)

**BL 4020 - Biochemistry II**

Dynamic aspects of living systems. Broad exposure to cellular metabolic pathways, intermediary metabolism and its regulation and bioenergetics.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 4010

**BL 4030 - Molecular Biology**

Molecular biology of gene structure, expression and regulation. Also topics covering various molecular techniques and applications of these techniques and biotechnology.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** (BL 1020 or BL 1040) and (BL 2100 or CH 4710)

**BL 4090 - Tropical Island Biology**

A survey of island biology, including marine and terrestrial habitats. Topics include formation of carbonate islands, geological history of the Bahamas, island plant communities, intertidal, grass bed, mangrove and coral reef communities. Special course fees. Consult department before enrolling. Completion of BL1020 or BL1040 desirable but not necessary.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Spring

**BL 4100 - Special Topics in Biological Sciences**

A study of recent developments in the biological sciences.

**Credits:** variable to 10.0; Repeatable to a Max of 10

**Semesters Offered:** Fall, Spring

**BL 4130 - Phycology**

Morphology, distribution, physiology, ultrastructure, taxonomy, and economic significance of freshwater and marine algae.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-3)

**Semesters Offered:** Fall - Offered alternate years beginning with the 2001-2002 academic year

**Pre-Requisite(s):** BL 2160

**BL 4140 - Plant Physiology**

Physiology and biochemistry of plants. Emphasizes photosynthesis, plant hormones, water and nutrient relations, and light-regulated development.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring - Offered alternate years beginning with the 2005-2006 academic year

**Pre-Requisite(s):** BL 2160 and CH 2420

**BL 4220 - Applied and Industrial Microbiology**

Discussion of microbial involvement in areas such as industrial production processes, biodeterioration, and organic and inorganic waste treatment. Also reviews current literature in these areas.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring - Offered alternate years beginning with the 2001-2002 academic year

**Pre-Requisite(s):** BL 3210 or BL 3310

**BL 4230 - Virology**

Comparison of bacterial, animal, and plant viruses, including a detailed study of viral structure and host-virus interaction in the viral replication process. Discusses important current areas of viral research, viral immune suppression, and oncogene theory.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-3-0)

**Semesters Offered:** Fall - Offered alternate years beginning with the 2003-2004 academic year

**Pre-Requisite(s):** BL 2100(C)

**BL 4320 - Histology**

Basic tissue structures and organs of the vertebrate organisms with emphasis on the human.

**Credits:** 4.0

**Lec-Rec-Lab:** (0-3-3)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 2010 and BL 2020

**BL 4370 - Cell Biology**

Celebration of the commonalities of life as exhibited in the basic building block of organisms - the cell. Course topics include details of basic genetic mechanisms, cell structure and function, and an examination of cells in their social context.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-3-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 2200 and CH 2420

**BL 4380 - Cardiopulmonary Physiology**

Using a problem-based learning approach, course examines the physiology of the human body. In-class case-study analyses provide in-depth learning about the cardiovascular and pulmonary systems and their relationship with other organ systems. Promotes development of problem-solving skills.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Pre-Requisite(s):** BL 2020

**BL 4430 - Biological Simulation Techniques**

Introduction to the use of mathematical techniques for simulation of biological phenomena, including programming techniques for computers.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-3)

**Semesters Offered:** Spring

**Pre-Requisite(s):** (BL 1020 or BL 1040) and (MA 1135 or MA 1160 or MA 1161)

**BL 4440 - Fish Biology**

Fishes and their habitat, native and exotic fishes of the Great Lakes region, and ocean fishery resources will be examined. Basic topics in Ichthyology and fish ecology, evolution, genetics, reproduction strategies and identification of early life stages, fish community structure, food webs and dynamics. Laboratory exercises on sampling, identification and classification of fishes and basic fish anatomy and discussion of scientific papers relevant to the subject material.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-0-3)

**Semesters Offered:** Spring - Offered alternate years beginning with the 2006-2007 academic year

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 1020 or BL 1040

**BL 4450 - Limnology**

Introductory study of interrelated physical, chemical, and biological processes of freshwater lakes. Field work on local lakes emphasized.

**Credits:** 4.0

**Lec-Rec-Lab:** (0-3-3)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** CH 1120 or CH 1122 or (CH 1160 and CH 1161)

**BL 4455 - Research Methods in Aquatic Ecology**

This field and laboratory based course for graduate students and advanced undergraduate students will provide exposure to a broad array of fresh water ecosystems and the current methods for quantitatively sampling them. We will explore the fish, invertebrates, and algae in streams, wetlands, Lake Superior, and smaller lakes using traditional and more novel sampling techniques framed by ecosystemic, taxonomic, ecological, historical, and evolutionary science.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-3)

**Semesters Offered:** Fall - Offered alternate years beginning with the 2009-2010 academic year

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

**BL 4460 - Biodiversity & Freshwater Ecosystems**

Course is designed for upper level undergraduates and graduate students interested in a broader understanding of Biodiversity and life's most precious and necessary resource - freshwater. Class will be a discussion of book chapters, scientific journal articles, contributed case study presentations by students, and a semester paper.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-3-0)

**Semesters Offered:** Spring - Offered alternate years beginning with the 2007-2008 academic year

**Pre-Requisite(s):** BL 1020 or BL 1040 or BL 3400

**BL 4470 - Analysis of Biological Data**

Methods and techniques of analyzing quantitative biological data and of designing biological experiments.

**Credits:** 4.0

**Lec-Rec-Lab:** (3-1-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** MA 1135 or MA 1160 or MA 1161

**BL 4500 - Critical Discussions in Bioinformatics**

Critical discussions of current topics in bioinformatics. Oral and written presentations requiring synthesis of information from various sources including primary literature.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 3300

**BL 4510 - Senior Essay**

Reading, interpreting, and integrating information from the primary literature of biological sciences. Emphasizes oral and written presentation skills.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Fall, Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Biochem & Molec Biology-Bio Sc, Biological Sciences; May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

**BL 4520 - Bioethics**

Moderated, objective discussion regarding the ethical issues arising from biotechnological advances. Issues are dissected using a normative ethics framework. Topics include general research ethics, use of genetically modified organisms, eco-ethics, genetic screening, behavioral genetics, cloning, stem cells, agribiotechnology, and privacy and property rights.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Spring - Offered alternate years beginning with the 2007-2008 academic year

**Pre-Requisite(s):** BL 2200(C)

**BL 4550 - Clinical Chemistry**

Theory and technique used in the routine and experimental analysis of body fluids. Includes the study of kidney and liver functions, electrolytes, medically important enzymes, protein electrophoresis, microanalytical techniques, and the use of automated analytical equipment.

**Credits:** 3.0

**Lec-Rec-Lab:** (2-0-3)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 2020 and BL 2410 and BL 3640

**BL 4610 - Clinical Laboratory Science Clinical Practicum I**

Practical and didactic training in clinical chemistry, immunopathology, and medical microbiology under the direction of National Accrediting Agency for the Clinical Laboratory Sciences (NAACLS)-approved/accredited hospital internship program personnel.

**Credits:** 15.0

**Lec-Rec-Lab:** (15-0-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science

**BL 4611 - Clinical Laboratory Science Clinical Practicum II**

Practical and didactic training in hematology, urinalysis, and immunohematology under the direction of National Accrediting Agency for the Clinical Laboratory Sciences (NAACLS)-approved/accredited hospital internship program personnel.

**Credits:** 15.0

**Lec-Rec-Lab:** (15-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science

**Pre-Requisite(s):** BL 4610

**BL 4620 - Histotechnology Practicum I**

Practical and didactic training in sample processing, microtome use, staining, instrumentation, grossing, embedding, and microscopy under the direction of National Accrediting Agency for the Clinical Laboratory Sciences (NAACLS)-approved/accredited hospital internship program personnel. Acceptance by a NAACLS-approved/accredited histological technology and/or histotechnologist hospital internship program required.

**Credits:** 14.0

**Lec-Rec-Lab:** (14-0-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science

**BL 4621 - Histotechnology Practicum II**

Practical and didactic training in histochemistry, DNA immunohistochemistry techniques, research methods, management, and safety under the direction of National Accrediting Agency for the Clinical Laboratory Sciences (NAACLS)-approved/accredited hospital internship program personnel.

**Credits:** 14.0

**Lec-Rec-Lab:** (14-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science

**Pre-Requisite(s):** BL 4620

**BL 4630 - Cytotechnology Practicum I**

Practical and didactic training in recognition of normal cells and cellular changes, particularly malignant, in the female reproductive tract, respiratory tract, and gastrointestinal tract under the direction of Committee on Accreditation of Allied Health Education Programs (CAAHEP)-approved/accredited hospital internship program personnel. Acceptance by a CAAHEP-approved/accredited cytotechnology hospital internship program required.

**Credits:** 14.0

**Lec-Rec-Lab:** (14-0-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science

**BL 4631 - Cytotechnology Practicum II**

Practical and didactic training in normal cell identification and recognition of cellular changes with emphasis on the diagnosis of cancer in the urinary, excretory, and neurological systems under the direction of Committee on Accreditation of Allied Health Education Programs (CAAHEP)-approved/accredited hospital internship program personnel.

**Credits:** 14.0

**Lec-Rec-Lab:** (14-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science

**Pre-Requisite(s):** BL 4630

**BL 4640 - Clinical Immunology & Serology**

Integrates basic and clinical immunological principles as well as outlines the diagnosis and evaluation of immune disorders and selected infectious diseases.

**Credits:** 2.0

**Lec-Rec-Lab:** (2-0-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 2410 and BL 3640

**BL 4660 - Current Topics in Clinical Laboratory Science**

Recent developments in Clinical Laboratory Science.

**Credits:** variable to 4.0; Repeatable to a Max of 6

**Semesters Offered:** Fall, Spring

**Restrictions:** Permission of instructor required

**BL 4720 - Hematology and Hemostasis**

Theory and laboratory applications. Emphasis will be placed on hematopoiesis, normal and disease states affecting blood cells and coagulation processes. The lab will focus on cell morphology and practical testing applications.

**Credits:** 3.0

**Lec-Rec-Lab:** (2-0-3)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences; Must be enrolled in one of the following Class(es): Junior, Senior

**Pre-Requisite(s):** BL 4730(C)

**BL 4730 - Immunohematology Techniques**

Theory and practical applications. Emphasis will be placed on blood antigens and antibodies, compatibility testing techniques, blood component therapy and safety issues.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science, Biological Sciences; Must be enrolled in one of the following Class(es): Junior, Senior

**Pre-Requisite(s):** BL 4720(C)

**BL 4740 - Introduction to Mycology**

The taxonomy and biology of major groups of fungi, focusing on their ecology and physiology. Emphasizes organisms of interest in medicine and forest ecology.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-2)

**Semesters Offered:** Fall - Offered alternate years beginning with the 2009-2010 academic year

**Pre-Requisite(s):** BL 1020 or BL 1040

**BL 4750 - Clinical Laboratory Instrumentation**

An overview of the principles, applications, and selection of instruments used in clinical laboratory. Lab work includes operation, maintenance, and trouble shooting to obtain experience working with power supplies, centrifuges, spectrophotometers, pH meters, osmometers, radiation counters, and chemistry analyzers, blood cell counters, and other instruments commonly used in a diagnostic laboratory.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-1-3)

**Semesters Offered:** Spring

**BL 4810 - Plant Taxonomy**

The classification system and the criteria for classification employed in the plant kingdom with emphasis on identification of vascular plants. A three-week field course during 1st track of summer semester. Class days include Saturdays.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-3)

**Semesters Offered:** Summer

**BL 4820 - Biochemical Laboratory Techniques I**

Laboratory techniques basic to biochemistry and molecular biology with emphasis on protein isolation, characterization and kinetics.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-1-3)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 4010(C) or CH 4710(C)

**BL 4830 - Advanced Biochemical Techniques**

Advanced Biochemical Techniques is designed to provide students with a rigorous exposure to the techniques and procedures utilized in the areas of Biochemistry. Emphasis will be placed on an active role of the student in the design of experiments and the collection and interpretation of biochemical data. Students will use microbial systems to construct and characterize experimental strains, monitor and interpret growth data and evaluate microbial regulatory systems via the use of measurements of enzyme specific activity, cell growth and viability and protein and nucleic acid synthesis.

**Credits:** 2.0

**Lec-Rec-Lab:** (1-0-3)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** (BL 4010 or CH 4710) and BL 4820

**BL 4840 - Molecular Biology Techniques**

Laboratory techniques in molecular biology, including methods of recombinant DNA technology for identification, cloning, and characterization of genes.

**Credits:** 3.0

**Lec-Rec-Lab:** (1-0-4)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** (BL 2100 or CH 4710) and BL 2200 and BL 4030(C)

**BL 4860 - Toxicology**

Focuses on principles and testing methods used to describe effects of chemical agents on biological material. Includes carcinogenic, mutagenic, and teratogenic effects and target organs of toxins. Also covers harmful effects of environmental agents such as pesticides and metals on humans, animals, and ecosystems.

**Credits:** 3.0

**Lec-Rec-Lab:** (2-1-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** BL 1020 or BL 1040

**BL 4979 - Clinical Laboratory Administration and Management**

A study of laboratory management and administration. Topics include human resource management, financial management, operations management and career success. Basic laboratory statistics will be covered with the emphasis on quality assurance and total quality management.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 2410

**BL 4980 - Clinical Laboratory Science Core Concept Integration and Application**

CLS Program Capstone Course. Review, and subsequently learn to integrate and apply, clinical core course material. Assignments include collaborative exercises involving development, peer review, and presentation of worksheets, case studies, and instrument evaluations, as well as other interactive learning activities.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Major(s): Clinical Laboratory Science; May not be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** BL 3230(C) and BL 4550(C) and BL 4640 and BL 4720 and BL 4730

**BL 4995 - Research in Biochemistry**

A literature and laboratory research problem in biochemistry that culminates in a written report on the work performed.

**Credits:** variable to 6.0; Repeatable to a Max of 9

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Major(s): Biochem & Molec Biology-Bio Sc, Chemistry, Clinical Laboratory Science, Bioinformatics, Biological Sciences; May not be enrolled in one of the following Class(es): Freshman