BIOMEDICAL LABORATORY SCIENCE (BLS)

BLS 1100 - Foundations of Medical Laboratory Science
Credit(s): 2 Credits
This course introduces students to medical science with an emphasis on Clinical Laboratory Science. Content focuses on major sub-specialities of medical science including chemistry, hematology, microbiology, urinalysis, and blood banking. Identification and exploration of research opportunities, career options and volunteering services are also covered. Teaching modalities include lectures, case studies and discussion of laboratory testing in disease diagnosis.
Corequisite(s): BLS 1150

BLS 1150 - Foundations of Medical Laboratory Science Lab
Credit(s): 1 Credit
This laboratory course is a supplement to the Foundations of Medical Laboratory Science lecture course (BLS 1100) and serves to reinforce the basic concepts through hands-on laboratory testing. Students will perform a variety of routine clinical laboratory tests to solve patient cases. Basic principles of testing methods, laboratory techniques and interpretation of laboratory results will be covered.
Corequisite(s): BLS 1100

BLS 1850 - Research
Credit(s): 1-3 Credits (Repeatable for credit)
This experiential course provides the opportunity to familiarize students with basic principles of research design, data collection, data analysis, and hypothesis testing. In consultation with a faculty mentor, the student selects a research project and begins the preliminary activities associated with developing a research question to include searching the literature, participation in grant, IRB and animal control protocols, procedure writing and training in research techniques. Experimentation and data collection may begin as time permits. Students are required to meet with their faculty mentor on a regular basis during the semester. No prerequisites required. Permission of the instructor.

BLS 2850 - Research
Credit(s): 1-3 Credits (Repeatable for credit)
This experiential course provides the opportunity to apply the basic principles of research design, data collection, data analysis, and hypothesis testing to a research study. In consultation with a faculty mentor, the student performs experiments and collects data to test the research hypothesis associated with the research project selected. Students are required to meet with their faculty mentor on a regular basis during the semester. Prerequisite(s): BLS 2850. Permission of instructor.

BLS 3850 - Research
Credit(s): 1-3 Credits (Repeatable for credit)
This experimental course provides the opportunity to apply the basic principles of research design, data collection, data analysis, and hypothesis testing to a research study. In consultation with a faculty mentor, the student performs experiments and collects data to test the research hypothesis associated with the research project selected. Students are required to meet with their faculty mentor on a regular basis during the semester. Prerequisite(s): BLS 2850. Permission of instructor.

BLS 4110 - Medical Biochemistry I
Credit(s): 3 Credits
Part one of a two-part course to study the biochemical principles as applied to clinical investigation of disease. Topics include but are not limited to: protein structure and function; enzyme kinetics; carbohydrate and lipid metabolism; hormonal regulation; pathophysiology of water, and electrolyte balance. Medical chemistry testing will be applied to the evaluation of organ systems for disease. BIOL-3020 recommended.
Prerequisite(s): CHEM 2410 with a grade of C- or higher
Restrictions:
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4120 - Medical Biochemistry II
Credit(s): 2 Credits
Continuation of BLS-4110 focusing on biochemical principles and their application to the clinical investigation of disease. Topics include but are not limited to: trace elements, acid base balance, endocrinology, therapeutic drug monitoring and toxicology investigative techniques.
Prerequisite(s): BLS 4110 with a grade of C or higher
Restrictions:
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.
BLS 4130 - Principles & Techniques in Molecular Biology
Credit(s): 1 Credit
Course provides an introduction to principles and applications of molecular biology to include nucleic acid biochemistry as well as basic molecular techniques to include but not limited to isolation and analysis of DNA and RNA, hybridization, amplification, sequence analysis, mutation detection, gel electrophoresis and array technology. Course includes the application of concepts and principles to the diagnosis of human disease. BIOL-3020 recommended.  
Prerequisite(s): BIOL 1240 with a grade of C- or higher  
Restrictions:  
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4210 - Hematology
Credit(s): 4 Credits
Content emphasizes the physiology of the blood forming organs and the maturation and function of their cellular products. Routine and confirmatory laboratory testing will be discussed to include purpose of test, performance of test and interpretation of results. Discussions will involve the pathophysiology, evaluation and diagnosis of blood dyscrasias to include anemias, leukemias, lymphomas, myeloproliferative and myelodysplastic conditions and other blood diseases using laboratory test results. BIOL-3020 recommended.  
Prerequisite(s): BIOL 1240 with a grade of C- or higher  
Restrictions:  
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4220 - Hemostasis and Thrombosis
Credit(s): 2 Credits
Principles and laboratory analysis of normal hemostasis and fibrinolysis will be presented to include blood vessel, platelet, and coagulation protein function. Discussions will include the pathophysiology of bleeding conditions, thrombotic disorders, and thrombophilia, and their diagnosis using laboratory results. The physiology and laboratory monitoring of anticoagulant therapy will be discussed.  
Prerequisite(s): BIOL 1240 with a grade of C- or higher  
Restrictions:  
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4210 - Immunohematology
Credit(s): 3 Credits
This course introduces basic immunologic and genetic principles governing blood groups and blood transfusion practice. Blood group systems, antibody identification, compatibility testing, and transfusion therapy are covered.  
Prerequisite(s): (BLS 4410 with a grade of C or higher or BLS 4411 with a grade of C or higher)  
Restrictions:  
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4310 - Fundamentals of Immunology
Credit(s): 2 Credits
Course focuses on the human immune system to include but is not limited to theories of innate, humoral and cellular immunity, development and functions of T-cells and B-cells, the antibody response, the genetics of antibody diversity. BIOL-3020 recommended.  
Prerequisite(s): BIOL 1240 with a grade of C- or higher  

BLS 4420 - Medical Immunology
Credit(s): 2 Credits
The course will apply concepts of basic immunology to human disease to include concepts of hypersensitivity, immune deficiencies, transplantation and tumor immunology. Lecture presentations of the recent advances in immunology that are relevant to transplantation, infectious disease, tumor immunology and nutrition. Prerequisites: BIOL 1240 & CHEM 1120; BLS 4411; BIOL 3020 recommended.  
Prerequisite(s): BIOL 1240 with a grade of C- or higher; BLS 4411 with a grade of C or higher  

BLS 4510 - Medical Microbiology
Credit(s): 4 Credits
Content focuses on microorganisms of pathologic importance to include bacteria and viruses with an overview of parasites and fungi involved in human disease. Included are discussions on structure, molecular biology, molecular diagnostics, metabolism, growth, replication, food borne illnesses, current topics and emerging concerns. Pathogenicity, epidemiology, diagnosis and laboratory identification of important groups of human pathogenic bacteria along with modes of action of selected antimicrobics and chemotherapeutic agents are also discussed. BIOL-3020 is recommended.  
Prerequisite(s): (BIOL 1100 with a grade of C- or higher or BIOL 1240 with a grade of C- or higher); CHEM 1120 with a grade of C or higher  

BLS 4610 - Research Design, Critique & Presentation
Credit(s): 3 Credits
"This course introduces students to research and includes discussion and assignments relevant to biomedical research design and performance. Topics include but are not limited to critical reasoning, safety and ethical components of research performance, literature review and critique, scientific writing and principles of effective presentations.

Prerequisite(s): MATH 1300 with a grade of C- or higher  
Restrictions:  
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4850 - Research
Credit(s): 3 Credits (Repeatable for credit)
This experiential course provides the opportunity for students to apply the basic principles of research design, data collection, data analysis, and hypothesis testing to a research study. In consultation with a faculty mentor, the student performs experiments and collects data to test the research hypothesis associated with the research project selected. The course culminates in a publication ready manuscript. Students are required to meet with their faculty mentor on a regular basis during the semester. Pre-requisite(s): BLS 3850. Permission of instructor.  
Prerequisite(s): BL 3850 with a grade of C or higher  
Restrictions:  
Enrollment is limited to students with a major in Investigative Medical Science or Medical Laboratory Science.

BLS 4980 - Independent Study
Credit(s): 3 Credits (Repeatable for credit)

BLS 4980 - Special Topics
Credit(s): 3 Credits (Repeatable for credit)
BLS 5125 - Introduction to Clinical Laboratory Medicine
Credit(s): 3 Credits
The purpose of the course is to discuss the most common laboratory tests ordered, performed, and interpreted in the areas of Clinical Chemistry, Hematology, Immunology, Transfusion Medicine (Blood Bank), Hemostasis, Medical Microbiology, and Urinalysis. Discussions will include the purpose of each test, test ordering practices, relationship to disease pathophysiology, result interpretation, and how test results are included in diagnostic algorithms. Physician Assistant majors only.

Restrictions:
Enrollment limited to students in the PA12 program.

BLS 5930 - Special Topics
Credit(s): 3 Credits (Repeatable for credit)

BLS 5980 - Independent Study
Credit(s): 1 or 3 Credits (Repeatable for credit)