

## COURSE DESCRIPTIONS

### CLINICAL LABORATORY SCIENCE MAJOR MEDICAL TECHNOLOGY OPTION

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**Chemistry 105 - Fundamental Chemistry** (5 cr) - (Two semester basic course) Fundamental principles and theories of chemistry, including stoichiometry, atomic and molecular structure and bonding, nuclear chemistry, thermodynamics, descriptive chemistry of nonmetals and transition metals, chemical kinetics and equilibria, introduction to organic chemistry. 3 hrs lec, 1 hr disc, 3 hrs lab per wk. Prereq: Math 90 or placement in 100 or above.

**Chemistry 106 - Fundamental Chemistry** (5 cr) - Continuation of 105. 3 hrs lec, 1 hr disc, 3 hrs lab per wk. Prereq: 105, Math 100 or higher.

**Chemistry 117 - General Chemistry Principles.** 5 cr. (1 semester course for especially well-prepared majors/minors). Laws and principles of chemistry including atomic and molecular structure, review of stoichiometry, descriptive inorganic chemistry of the representative and transition elements, chemical equilibria, electrochemistry, thermodynamics, and chemical kinetics. 3 hrs lec, 1 hr disc, 3 hrs lab per week. Prereq: AP/IB HS chemistry with a grade of B or better and placement into Math 119 or 1 year of HS chemistry with a grade of B or better and placement into Math 120; or cons chair.

**Chemistry 248 - Quantitative Analysis** (3 cr) – Theory and methods of quantitative chemical analysis including effects of chemical equilibria on quantitative separations, titration curves, polyprotic acids and buffers, and oxidation-reduction processes. 2 hrs lec, 6 hrs lab per wk. Prereq: 106 or 117.

**Chemistry 325 - Organic Chemistry** (3 cr) - (Two semester course) Structure, conformation, stereochemistry, properties and reactions of organic compounds. Structure-property relationships and reaction mechanisms and their application in the study of a broad range of representative functional groups and compounds including carbohydrates, polymers, amino acids and proteins. Retrosynthetic analysis and spectroscopic characterization of organic modules. 3 hrs lec, 3 hrs lab per wk. Prereq: 106 or 117.

**Chemistry 326 - Organic Chemistry** (3 cr) - Continuation of 325. Prereq: 325.

**Chemistry 365 - Biochemistry** (4 cr) - Chemistry of the components of living cells, and the nature and mechanism of cellular reactions. Three hours lecture, three hours lab per week. Prereq: 248, and 326, 328.

**Biology 160 - Introduction to Animal Biology** (5 cr) - Anatomy, physiology, adaptation, and classification of animals; morphology and anatomy of various types of animals. Three hours lecture, three hours lab per week. Additional two-hour test sections four times during the semester.

**Biology 210 - Principles of Genetics** (3 cr) - General principles of heredity and variation of plants and animals, including humans. Prereq: Sophomore standing.

**Biology 285 - Human Physiology** (4 cr) - Normal functions of organ systems in humans; fulfills the physiology requirements for biology, human development and nutritional sciences, physical education majors, and is recommended for students with preprofessional interests in medical or allied health fields. Three hours lecture, three hours lab per week. Prereq: 160; or 101 and Chemistry 101.

**Biology 333 - General Microbiology** (4 cr) - Morphology, physiology classification, and cultivation of bacteria and viruses, with introduction to microbial genetics, pathogenesis, and immunology. Two hours lecture, four hours lab per week. Prereq: 101, 130, or 160; and Chemistry 106 or 117.

**Mathematics 100 - College Algebra** (3 cr) - Functions, solutions and graphs of linear and quadratic equations, inequalities and systems of equations; logarithmic and exponential functions. Prereq: 051 or suitable placement test score.

**Mathematics 355 - Elementary Statistical Methods** (4 cr) - Fundamental concepts and techniques which underlie applications to the various disciplines, including descriptive statistics; averages; dispersion; random sampling; binomial, normal, Student T, Chi-square, and F distributions; estimation and tests of hypothesis; linear regression and correlation; laboratory emphasis on sampling and applications. Prereq: 100 or a suitable placement test score.

### **COURSES IN CLINICAL LABORATORY SCIENCE (CLS)**

**CLS 105 Evolution of Health Care and Health Care Professions** (3 cr) - Study of the history of medicine and the evolution of health care professions in the context of philosophical and cultural influences; examination of various health care systems; analysis of current health care system and health professions in the United States. 3 hrs lecture per week.

**CLS 125 Intro to Clinical Laboratory Science 1** (2 cr.) Overview of laboratory safety, phlebotomy, immunology, immunohematology, hematology, coagulation, clinical chemistry, body fluid analysis, diagnostic microbiology, and molecular pathology. Major topics are accompanied with introductory lab exercises. 1 hr lec, 2 hrs lab per wk.

**CLS 205 Clinical Orientation** (1 cr; pass/fail) - Hospital introduction to laboratory techniques. Open to students considering a major in Clinical Laboratory Science.

**CLS 295 Medical Terminology** (2 cr) - Examination of bases of medical terms: prefixes, suffixes, roots, combined forms; terms that name the nine basic body systems and organs. 2 hrs lecture per week.

**CLS 365 Body Fluid Analysis** (2 cr) - Theoretical and practical aspects of chemical and microscopic analysis of urine, cerebrospinal fluid, synovial fluid, and serous fluid. 2 hrs lecture per week. Independent lab. Prereq: Biology 285.

**CLS 375 Quality Systems in the Clinical Laboratory** (1 cr) - Study quality management in the clinical laboratory; discuss pre-analytical, analytical, and post analytical phases of testing, statistical methods of quality control, regulatory requirements, verification of instrument maintenance and functions, and risk assessment. Prereq: Admission to the professional program.

**CLS 385 Professional Leadership Development** (3 cr) - Study professional roles, responsibilities, contemporary problems and conflicts as related to leadership and laboratory administration; discuss human resource management, financial management, and education methodologies appropriate for supervisors and managers. 2 hrs lecture, 2 hrs lab per week. Prereq: Junior standing.

- CLS 405**      **Clinical Chemistry** (4 cr) - Study physiology of body analytes, organ systems, and clinical procedures corresponding to human disease states; discuss areas unique to clinical chemistry laboratory and professional performance. 3 hrs lecture, 3 hrs lab per week. Prereq: Chemistry 365 or concurrent registration.
- CLS 406\***      **Clinical Chemistry Practicum** (4 cr) - Apply principles of clinical chemistry; use chemical analytical techniques to determine specific substances and correlate results to various disease states.  
Prereq: CLS 405; Admission to the professional program.
- CLS 414**      **Hemostasis** (1 cr) - Study of the mechanisms and disorders of hemostasis and fibrinolysis; diagnostic techniques and instrumentation used in patient diagnosis. 1 hr lecture, 1 hrs lab per week. Prereq: Biology 285.
- CLS 415**      **Hematology** (4 cr) - Study of the hematopoietic system including the relationship of hematologic disease states to diagnostic characteristics; determine blood and bone marrow cellular morphology; discuss erythrocyte and leukocyte disorders; study techniques and correlate results to disease processes. 3 hrs lecture, 3 hrs lab per week. Prereq: Biology 285.
- CLS 416\***      **Clinical Hematology/Hemostasis Practicum** (4 cr) - Practical application of theoretical knowledge in hematology and hemostasis; process and analyze patient specimens; use instrumentation and microscopic techniques to determine anemias, leukemias, coagulation disorders, and other disease processes. Prereq: CLS 415; Admission to professional program.
- CLS 425**      **Diagnostic Medical Microbiology** (5 cr) - Study bacterial, mycoplasmal, rickettsial, chlamydial, parasitic, and mycotic diseases of humans; identify clinical signs and symptoms of these diseases; explore collection, transportation, modes of transmission, and laboratory methods utilized to detect and identify the pathogens as well as appropriate antibiotic therapy. 3 hrs lecture, 6 hrs lab per week. Prereq: Biology 333.
- CLS 426\***      **Diagnostic Medical Microbiology Practicum** (5 cr) - Cultivate, isolate, and identify pathogenic bacteria, fungi, viruses, and parasites from a variety of patient specimens; perform antibiotic sensitivities and therapeutic drug testing.  
Prereq: CLS 425; Admission to the professional program.
- CLS 427**      **Diagnostic Medical Parasitology** (1 cr) - Study of life cycles of human parasites of medical significance. Identify clinical signs, symptoms, treatment, and epidemiology associated with human parasitic disease. Examine specimen collection, transportation and laboratory methods used to detect and identify the parasites. 1 hr lecture, 2 hrs lab per week, for 8 weeks. Prereq: Biology 333.
- CLS 428**      **Diagnostic Medical Mycology** (1 cr) - Study medically significant fungi. Identify clinical signs, symptoms, treatment, and epidemiology associated with human mycotic diseases. Explore laboratory methods used to detect and identify organisms. 1 hr lecture, 2 hours lab per week. Prereq: Biology 333.
- CLS 435**      **Immunology** (3 cr) - Study concepts in immunology and serologic techniques used to diagnose disease; discuss immunodeficiency diseases, autoimmune disorders, immunology of malignancies, and hypersensitivities. 2 hrs lecture, 3 hrs lab per week. Prereq: Biology 285.

- CLS 436\***     **Clinical Immunology Practicum** (2 cr) - Apply clinical immunologic techniques to identify antigen-antibody reactions and relate to disease states; explore principles and interpretation of HLA testing and flow cytometry.  
Prereq: CLS 435; Admission to the professional program.
- CLS 445**     **Immunoematology** (3 cr) - Study of human blood group systems, antibody screening and identification, blood components, compatibility testing, donor selection and processing, blood bank regulations; perform blood bank procedures. 2 hrs lecture, 3 hrs lab per week. Prereq: Biology 285.
- CLS 446\***     **Clinical Immunoematology Practicum** (3 cr) - Concepts of blood banking; determine patient compatibility for blood and blood components; solve hemolytic disease and antibody identification problems; process blood and components; explore histocompatibility techniques.  
Prereq: CLS 445; Admission to the professional program.
- CLS 456\***     **Advanced Application Practicum** (1 cr) - Advanced study in specific practice of Clinical Laboratory Science such as ancillary testing, laboratory information systems, primary care laboratory, management, industry, cytogenetics or molecular biology. Prereq: Admission to the professional program.
- CLS 465**     **Molecular Pathology** (3 cr) - Study composition, structure, function, and characteristics of DNA; use clinical laboratory techniques to isolate, amplify, manipulate, and analyze DNA sequences; relate to human health and disease states. 1 hr lecture, 6 hrs lab per week.  
Prereq: Admission to the professional program.
- CLS 476\***     **Clinical Body Fluid Analysis** (1 cr) - Clinical study of body fluids including cerebral spinal fluid, synovial fluid, pleural fluid, seminal fluid, and urinalysis; discuss specimen analysis, diagnostic procedures, and test results as related to disease. Prereq: 365; Admission to professional program.
- CLS 486\***     **Management and Laboratory Information Systems** (2 cr) - Management theory and application of management techniques to laboratory situations; fundamentals of laboratory information systems.  
Prereq: CLS 385; Admission to professional program.
- CLS 495**     **Research Design and Methods in Clinical Laboratory Science** (1 cr) - Apply scientific method to clinical laboratory research problems; explore research design principles; write research proposals; design research project. 1 hr lecture per week. Prereq: Admission to the professional program.
- CLS 496**     **Clinical Correlations 1** (1 cr) - Correlation of symptoms, clinical test results, and diagnosis of diseases as related to cardiovascular, pulmonary, renal, gastrointestinal, and hepatobiliary disorders; appropriate laboratory utilization.  
Prereq: Admission to professional program.
- CLS 497\***     **Clinical Correlations 2** (1 cr) - Correlation of symptoms, clinical test results, and diagnosis of diseases as related to endocrine, reproduction, neurological, hematologic, and immunologic disorders; appropriate laboratory utilization.  
Prereq: Admission to professional program.
- CLS 498\***     **Clinical Correlations 3** (1 cr) - Correlation of symptoms, clinical test results, and diagnosis of diseases as related to tumor markers, infectious disease, nutritional and metabolic disorders, toxicology and drug monitoring, the neonate, and geriatrics. Prereq: Admission to professional program.

**CLS 499\***     **Advanced Clinical Studies** (2 cr) - Under supervision of mentor, design and conduct research project in specialty area of clinical laboratory science; prepare major research paper and presentation. This is a capstone course.  
Prereq: Admission to the professional program.

**\*CLINICAL PRACTICUM:** These courses will be completed at the affiliated clinical laboratories.