

## **Master of Science in Clinical Laboratory Sciences Course Descriptions**

### **CLS 5000 Current Issues in Clinical Laboratory Sciences (3 units)**

This is a seminar course designed to discuss the most pertinent issues facing today's clinical laboratory scientists.

### **CLS/BIO 5110 Clinical Laboratory Laws, Regulations, Accreditations and Ethics (3 units)**

Lectures and discussions will provide an in-depth understanding and analysis of current laws, regulations, and accreditations that govern the clinical laboratory. Topics will include understanding and implementing the laws and regulations outlined by: the Clinical Laboratory Improvement Amendments (CLIA); California Business and Profession Code and Code of Regulations covering clinical laboratories; the Occupational Safety and Health Administration (OSHA); the Federal Drug Administration (FDA); the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO); the College of American Pathologists (CAP); the Association of Public Health Laboratories (APHL); and the Health Insurance Portability and Accountability Act (HIPAA). This course will also explore standard, acceptable and ethical research practices in advanced biological and clinical laboratory sciences, emphasizing responsibilities.

### **CLS 5120 Clinical Lab: Financial Management and Utilization (3 units)**

This course is designed to introduce students to the various financial issues that must be addressed in the clinical lab. These issues include: generating and implementing a budget; determining laboratory fee rates and employee salaries; managing supply inventories; and preparing for prudent and cost-effective capital expenditures. In addition, students will learn about the various approaches and techniques necessary to make sure that clinical laboratory testing is carried out in a cost-effective way that also ensures optimal quality health care for patients. Topics will include comparing parallel and serial testing and automated patient models.

### **CLS 5200 Quality Systems (3 units)**

This course will discuss and implement an effective quality system model akin to ISO15189 and Clinical and Laboratory Standards Institute (CLSI) GP26. Lectures and discussion will focus on quality management system and quality system essentials. The course will also include topics as related to method validation and specifications development for laboratory developed tests as well as quality control (QC) and quality assurance (QA) measures in the clinical laboratory.

### **CLS 5700 Master's Research Project (3 units)**

This is a semester-long, CLS-related research project designed and carried out by the individual student with the aid of a research supervisor. A final paper and oral presentation are required to successfully complete this course.

### **BIO 5200 Advanced Molecular Biotechnology (3 units)**

This course will cover applied concepts and research techniques in molecular biology. It is designed to study more advanced concepts and how they may be applied in biotechnology or the clinical lab. Topics include: various PCR techniques, recombinant DNA technology, site-directed-mutagenesis, epigenetic modifications, gene silencing, microarrays, and gene expression systems.

### **BIO 5410 Molecular Diagnostics Laboratory I (3 units)**

This is an introductory lab-based course designed to familiarize students with basic molecular and biochemical techniques including: nucleic acid and protein extraction and quantification; gel electrophoresis, including both agarose and SDS-polyacrylamide gels; Southern, northern, and western blotting; and the polymerase chain reaction (PCR), including reverse transcription PCR (RT-PCR) and "real-time" or quantitative PCR (qPCR).

**BIO 5420 Molecular Diagnostics Laboratory II (3 units)**

This lab-based course is intended to build upon the skills acquired in BIO 5410 by introducing students to additional molecular diagnostic techniques used in the clinical lab, such as: DNA sequencing; fluorescent *in situ* hybridization (FISH); restriction fragment length polymorphism (RFLP) analysis; and DNA and RNA microarray technology.

**BIO 5600 Scientific and Technical Writing (3 units)**

This course is designed to improve students' scientific and technical writing skills through various reading and writing assignments. Students will learn how to generate comprehensive, easy-to-follow protocols according to CLSI guidelines as well as write papers in journal article format.

**MBA 5225 Technical Project Management (3 units)**

This course is an in-depth evaluation of selected case studies in the following topic areas (1) Managing the Creative Process in Cross-Functional Global Environment (Exploration), (2) Product Concept Development in a Competitive Market Place (Product Development), (3) Business Analysis and Market Potential (Market Place Intelligence), (4) Getting a Product from the Laboratory to the Market (Commercialization), (5) Product Technical Support, (6) Protection of Intellectual Property Rights (Patents), and (7) Technology Project Funding (Government, Private and Venture Capital). Sustainability is built into each topic. Students will examine and evaluate the technical and business merits of selected cases. Students will develop a sustainable business plan for each case.