

- 442. Education and Management in the Clinical Laboratory**  
Fall, 3(3-0)  
R: Open only to majors in Clinical Laboratory Sciences. Concepts of management in clinical laboratory practice. Program accreditation and certification. Government regulation. Personnel recruitment and selection. Performance evaluation. Financial management.
- 444. Problem Solving Across Clinical Laboratory Disciplines (W)**  
Spring, 4(4-0)  
P: MT 212, MT 213, MT 414, MT 415, MT 416, MT 422, MT 423, MT 432, MT 433, MIC 463, MIC 464. R: Open only to seniors in Clinical Laboratory Sciences. Completion of Tier I writing requirement.  
Problem-oriented approach integrates topics from previous courses in clinical laboratory sciences, social sciences, and humanities. Emphasis on published primary research literature and its critical appraisal.
- 445. Integrating Clinical Laboratory Science Discipline (W)**  
Spring, 2(2-0)  
P: MT 414, MT 416, MT 422, MT 432, MIC 463. R: Open only to seniors in Medical Technology. Completion of Tier I writing requirement.  
Problem oriented approach integrating topics from Medical Technology courses with emphasis on writing experience in the major and on critical thinking skills.
- 471. Advanced Clinical Chemistry Laboratory**  
Fall, Spring, Summer, 3 credits.  
C: MT 472 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Application and integration of theory and technical skills of chemistry and biochemistry.
- 472. Advanced Clinical Chemistry**  
Fall, Spring, Summer, 1 credit.  
C: MT 471 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Theoretical aspects of clinical chemistry. Chemical and biochemical reactions. Statistical analysis, pathophysiological relationships, and methodologies.
- 473. Advanced Clinical Hematology and Body Fluids Laboratory**  
Fall, Spring, Summer, 4 credits.  
C: MT 474 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Application of the theory of hematology, hemostasis, and body fluid analysis.
- 474. Advanced Clinical Hematology and Body Fluids**  
Fall, Spring, Summer, 1 credit.  
C: MT 473 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Theoretical aspects of advanced hematology, hemostasis and body fluid analysis. Integration of cognitive material with test results.
- 475. Advanced Clinical Immunology and Immunohematology Laboratory**  
Fall, Spring, Summer, 2 credits.  
C: MT 476 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Application of immunology and immunohematology principles.
- 476. Advanced Clinical Immunology and Immunohematology**  
Fall, Spring, Summer, 1 credit.  
C: MT 475 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Theory of immunology and immunohematology. Integration of cognitive material with test results.
- 477. Advanced Clinical Microbiology Laboratory**  
Fall, Spring, Summer, 3 credits.  
C: MT 478 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Application of clinical microbiology.
- 478. Advanced Clinical Microbiology**  
Fall, Spring, Summer, 1 credit.  
C: MT 477 concurrently. R: Open only to seniors in Clinical Laboratory Sciences.  
Theory of clinical microbiology. Integration of cognitive material with laboratory results.
- 495. Directed Study**  
Fall, Spring, Summer, 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Open only to Clinical Laboratory Science and Medical Technology majors.  
Faculty directed study including assigned readings, reviews of appropriate scientific periodicals, and research laboratory experience.
- 801. Medical Technology Seminar**  
Spring, 1(1-0) A student may earn a maximum of 2 credits in all enrollments for this course.  
R: Open only to graduate students in Clinical Laboratory Sciences.  
Current research topics in clinical laboratory sciences.
- 810. Research Planning in the Clinical Laboratory Sciences**  
Fall of odd-numbered years, 2(2-0)  
R: Open only to graduate students in Clinical Laboratory Sciences.  
Directed reading and discussions on research methodology and research funding. Written and oral proposal presentations.
- 812. Advanced Clinical Chemistry**  
Spring of even-numbered years, 2(2-0) Interdepartmental with Pathology.  
P: BCH 462, MT 414, MT 416.  
Biochemical basis of selected pathologic conditions including inborn errors of metabolism, endocrine and other genetic disorders. Emphasis on current diagnostic techniques.
- 820. Advanced Human Hematology**  
Fall of even-numbered years, 2(2-0) Interdepartmental with Pathology.  
P: MT 422.  
Selected topics in hematology including pathogenesis, mechanisms and morphological pictures. Emphasis on laboratory tests and interpretation of results.
- 830. Concepts in Molecular Biology**  
Spring of odd-numbered years, 2(2-0) Interdepartmental with Pathology.  
P: One course in Biochemistry or concurrently.  
Techniques and theories of molecular biology, nucleic acid synthesis and isolation, enzymatic digestion and modification, electrophoresis, hybridization, amplification, library construction, and cloning.
- 840. Advanced Hemostasis**  
Fall of odd-numbered years, 2(2-0) Interdepartmental with Pathology.  
P: BCH 462, MT 422.  
Physiology, pathophysiology, and laboratory evaluation of hemostatic disorders.
- 860. Clinical Laboratory Diagnosis of Infectious Diseases**  
Spring of even-numbered years, 2(2-0) Interdepartmental with Pathology.  
P: MIC 451, MIC 464.  
Laboratory techniques for diagnosing infectious diseases in humans. Emphasis on differential diagnosis and correlation of microbiological results with serology, hematology, and clinical chemistry.
- 890. Selected Problems in Clinical Laboratory Science**  
Fall, Spring, Summer, 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Open only to graduate students in Clinical Laboratory Sciences.  
Non-thesis research for Plan B master's students.
- 899. Master's Thesis Research**  
Fall, Spring, Summer, 1 to 10 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to graduate students in Clinical Laboratory Sciences.

## MEDICINE

## MED

### Department of Medicine College of Human Medicine

- 450. Cancer Biology**  
Spring, 3(3-0) Interdepartmental with Zoology. Administered by Zoology.  
P: BCH 200 or BCH 401; ZOL 221.  
Cancer biology: cellular and molecular aspects. Applications of modern biotechnology to cancer research. Causes, treatment and prevention of cancer. World distribution and risk factors of cancer.
- 512. Infectious Diseases**  
Spring, 4 credits. Interdepartmental with Microbiology.  
P: MIC 511 or approval of department. R: Open only to graduate-professional students in College of Human Medicine.  
Infectious diseases of humans. Biology of the causative microorganism, epidemiology, pathogenesis, host-parasite relationships. Clinical and laboratory diagnosis, and clinical management.
- 590. Special Problems in Medicine**  
Fall, Spring, Summer, 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Open only to graduate-professional students in College of Human Medicine.  
Supervised work on an experimental, theoretical, or applied problem.
- 608. Internal Medicine Clerkship**  
Fall, Spring, Summer, 2 to 18 credits. A student may earn a maximum of 42 credits in all enrollments for this course.  
P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine.  
Community hospital clerkship. Interviewing skills, history, physical examination. Problem solving and therapy. Care of the whole patient leading to independence in patient management.
- 609. Hematology Clerkship**  
Fall, Spring, Summer, 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.  
Data collection, problem solving, and management related to common hematologic disorders of children and adults.
- 610. Oncology Clerkship**  
Fall, Spring, Summer, 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.  
Data collection, problem solving and management of prevalent cancers in children and adults.

**Descriptions —Medicine  
of  
Courses**

**611. Cardiology Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Evaluation of patients with cardiac diseases. Special diagnostic procedures including cardiac cuticularization, phonocardiography, echocardiography, and electrocardiography.

**612. Nephrology Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Integrated concepts of renal physiology and pathophysiology of renal disease. Clinical experience.

**613. Dermatology Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Experience in a dermatologist's office to develop clinical, observational, and diagnostic skills in dermatology.

**614. Pulmonary Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Pulmonary physiology. Evaluation of pulmonary function. Diagnosis and treatment of common pulmonary diseases.

**615. Gastroenterology Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Experience with gastrointestinal problems in ambulatory and hospital settings. Emphasis on continuity and comprehensive care.

**616. Allergy Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Ambulatory and hospital based experience to develop diagnostic skills in allergy. Review of basic therapeutics related to allergic diseases.

**617. Neurology Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Office and inpatient experience. Evaluation and management of neurological disease.

**618. Infectious Diseases Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Clinical problems in infectious and immunologic diseases. Integrated basic science input is provided in seminars.

**619. Ambulatory Care Clerkship**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 15 credits in all enrollments for this course. Interdepartmental with Family Practice and Pediatrics. Administered by Family Practice.

P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine. Continuous and comprehensive patient care under supervision of appropriate physicians.

**622. Endocrinology and Metabolism Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Clinical and/or clinical-research clerkship: endocrine diseases, electrolyte abnormalities, endocrine hyper-tension, or diabetes mellitus.

**623. Advanced Medicine**  
Fall, Spring, Summer. 6 credits. A student may earn a maximum of 18 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Hospital-based clinical experience in diagnosing and managing acutely ill patients with non-surgical problems.

**626. Physical Medicine and Rehabilitation Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Developing regimens for physical medicine procedures, occupational therapy and rehabilitation skills.

**627. Rheumatology Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Combined ambulatory and hospital consultative clerkship for diagnostic skills in areas of rheumatic diseases.

**628. Advanced Internal Medicine**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Clinical experiences to refine diagnostic and management skills in general internal medicine.

**630. Emergency Medicine Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Clinical diagnosis and treatment of emergencies seen in community emergency departments.

**632. Occupational Medicine Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: MED 608. R: Open only to graduate-professional students in College of Human Medicine. Health problems of chemical and mineral dust, radiation, and repetitive trauma.

**635. Core Competencies I**  
Fall. 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Human Medicine, Family Practice, and Pediatrics and Human Development. Administered by Human Medicine.

P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine. A weekly seminar addressing core knowledge and skills from an interdisciplinary perspective.

**636. Core Competencies II**  
Spring. 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Human Medicine and Family Practice. Administered by Human Medicine.

P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine. A weekly seminar addressing core knowledge and skills from an interdisciplinary perspective.

**637. Core Competencies III**  
Spring, Summer. 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Human Medicine, Pediatrics and Human Development, Family Practice, Surgery, and Obstetrics, Gynecology and Reproductive Biology. Administered by Human Medicine.

P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine. A weekly seminar addressing core knowledge and skills from an interdisciplinary perspective.

**640. Advanced Comprehensive Care**  
Fall, Spring, Summer. 6 credits. A student may earn a maximum of 18 credits in all enrollments for this course. Interdepartmental with Human Medicine, Pediatrics and Human Development, Family Practice, and Obstetrics, Gynecology and Reproductive Biology. Administered by Human Medicine.

P: FMP 608, PHD 600, MED 608. R: Open only to graduate-professional students in College of Human Medicine. Clinical experience in community-oriented primary care. Emphasis on urban and rural underserved populations.

**645. Primary Health Care in Ecuador**  
Summer. 6 credits.

R: Open only to graduate-professional students in the colleges of Human and Osteopathic Medicine and to graduate students in the College of Nursing. Special problems and challenges to delivery of primary health care in a developing country. Culture and related health care issues in cities and rural areas.

**MICROBIOLOGY MIC**

**Department of Microbiology  
College of Human Medicine  
College of Natural Science  
College of Osteopathic Medicine  
College of Veterinary Medicine**

**101. Preview of Microbiology**  
Fall. 1(1-0)

R: Open only to freshmen and sophomores. Not open to students with credit in a microbiology course. Overview of modern microbiology, emphasizing impact on society.

**103. Frontiers of Microbiology**  
Spring. 1(2-0)

R: Open only to freshmen and sophomores. Current microbiology research: significance to modern biological science and impact on society.