474. Advanced Clinical Hematology and Body Fluids
Fall, Spring, Summer. 1 credit.
C: MT 473. 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. 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. 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. 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. 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.

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 hypertension, 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.

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.

105. Microbes in Everyday Life
Fall. 3(3-0)
Role of microbes in agriculture, industry, and medicine. Impact on society of infectious diseases of plants and animals, soil fertility, water quality, biotechnology, genetic engineering, and bioremediation. Public health and environmental concerns.

205. Allied Health Microbiology
Spring. 3(3-0)
P: CEM 141 or CEM 151.
Microbial structure, function, growth, death, and control related to medical and public health concerns. Host-parasite relationships, immunology, action of major pathogenic groups. Commercial applications of microbiology.

206. Allied Health Microbiology Laboratory
Spring. 1(0-2)
P: MIC 105, MIC 205 or concurrently.
Fundamentals of microbiological techniques including microscopy, staining, aseptic technique, culture media, identification, control with disinfectants and antibiotics, and safety in the microbiological laboratory.

301. Introductory Microbiology
Spring. 3(3-0)
P: BS 111; CEM 251 or concurrently.
Fundamentals of microbiology, including microbial structure and function, nutrition and growth, death and control. Importance and applications of major microbial groups.

302. Introductory Microbiology Laboratory
Spring. 1(0-3)
P: MIC 301 or concurrently.
Methodology of microbiology: microscopy, staining, aseptic technique, culture media, quantification, and laboratory safety.

406. Medical Mycology
Spring. 3(2-3) Interdepartmental with Botany and Plant Pathology, and Medical Technology. Administered by Botany and Plant Pathology.
P: BOT 402, MIC 302.
Characteristics and laboratory identification of fungal diseases in humans and other animals. Laboratory techniques. Morphology of causative fungi.

408. Advanced Microbiology Laboratory (W)
Fall. 3(1-6)
P: MIC 302; MIC 401 or concurrently. R: Open only to Microbiology majors. Completion of Tier I writing requirement.
Microbiological techniques and procedures to study physiology and genetics of bacteria and bacteriophages. Collection and critical assessment of quantitative data and written communication of results.

409. Eukaryotic Cell Biology
Spring. 3(3-0)
P: BS 111.
Structure and function of nucleated cells. Emphasis on the molecular mechanisms that underlie cell processes.