433. Clinical Immunology and Immunohematology Laboratory
Spring. 1(0-3) P: (MT 213 and MT 432 or concurrently) R: Open only to seniors in the Clinical Laboratory Sciences major.
Immunologic methods for disease detection. Methods of blood typing and pre-transfusion testing.

442. Education and Management in the Clinical Laboratory
Fall. 3(3-0) P: (MTH 116 or (MTH 103 and MTH 104) or (LBS 117) or (STT 200 or STT 201 or STT 231 or STT 351 or STT 421) R: Open only to students in the Clinical Laboratory Sciences major.
Basic principles and concepts in education and management in clinical laboratories. Systematic approach to instructional design, delivery and evaluation. Principles of leadership, personnel management, fiscal management, and regulatory compliance.

454. Problem Solving Across Clinical Laboratory Disciplines (W)
Spring. 4(4-0) P: (MT 414 and MT 416 and MT 422 and MT 432 and MIC 463) RB: (MT 442) R: Open only to seniors in the Clinical Laboratory Sciences major.
Problem-oriented approach integrating topics from previous courses in clinical laboratory sciences. Emphasis on published primary research literature and its critical appraisal.

471. Advanced Clinical Chemistry Laboratory
Fall, Spring. Summer. 3 credits. P: (MT 454) Application and integration of theory and technical skills in clinical chemistry and biochemistry.

472. Advanced Clinical Chemistry
Fall, Spring. Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 471 concurrently.
Theoretical aspects of clinical chemistry, chemical and biochemical reactions, statistical analysis, and pathophysiological relationships. Integration of cognitive material with clinical laboratory test results.

473. Advanced Clinical Hematology and Body Fluids Laboratory
Fall, Spring, Summer. 4 credits. P: (MT 454) Application and integration of theory and technical skills in hematology, hemostasis, and body fluid analysis.
474. Advanced Clinical Hematology and Body Fluids
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 473 concurrently.
Theoretical aspects of advanced hematology, hemostasis and body fluid analysis. Integration of cognitive material with clinical laboratory test results.

475. Advanced Clinical Immunology and Immunohematology Laboratory
Fall, Spring, Summer. 2 credits. P: (MT 454) Application and integration of theory and technical skills in immunology and immunohematology.

476. Advanced Clinical Immunology and Immunohematology
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 475 concurrently.
Theoretical aspects of immunology and immunohematology. Integration of cognitive material with clinical laboratory test results.

477. Advanced Clinical Microbiology Laboratory
Fall, Spring, Summer. 3 credits. P: (MT 454) Application and integration of theory and technical skills in clinical microbiology and infectious disease.

478. Advanced Clinical Microbiology
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 477 concurrently.
Theoretical aspects of clinical microbiology and infectious disease. Integration of cognitive material with clinical laboratory test 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 students in the Clinical Laboratory Sciences or Medical Technology major.
Faculty directed study including assigned readings, reviews of appropriate scientific periodicals, research and 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 years. 2(2-0) Interdepartmental with Pathology. P: BCH 462, MT 422. Selected topics in hematology including pathogenesis, mechanisms and morphological pictures. Emphasis on laboratory tests and interpretation of results.

820. Advanced Human Hematology
Fall of even 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 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.

831L. Molecular Pathology Laboratory
Summer. 2(0-4) P: (MT 831 or concurrently)
Equipment operation, DNA extraction and measurement, electrophoresis, hybridization and transfers, amplification and detection including SSOP, ARMS, RFLP and SCP as well as automated sequencing will be covered with specific emphasis on clinical applications.

840. Advanced Hemostasis
Fall of odd years. 2(2-0) Interdepartmental with Pathology. P: BCH 462, MT 422.
Physiology, pathophysiology, and laboratory evaluation of hemostatic disorders.

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—Descriptions of Courses

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.
Continuous and comprehensive care.

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.

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 cutopticization, 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.

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.
Clinical and/or clinical-research clerkship: endocrine hypertension, or diabetes mellitus.

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.

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; 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.

620. 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.

621. Advanced Medicine
Fall, Spring, Summer. 6 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 the College of Human Medicine.
Hospital-based clinical experience in diagnosing and managing acutely ill patients with non-surgical problems.

622. Advanced Clinical Experience
Fall, Spring, Summer. 6(6-0) P: (MED 608)
Based in community hospitals and ambulatory sites, this is a 4 week clinical experience emphasizing interviewing skills, history, physical exam, problem solving and therapy.

623. 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 Health 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.

624. 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.
Microbiology—Descriptions of Courses

205. Allied Health Microbiology Laboratory
Spring, 3(3-0) P: (BS 111 or LBS 145 or concurrently or LBS 149H or concurrently) 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.
SA: MPH 205

206. Allied Health Microbiology Laboratory
Spring, 1(0-2) P: (MIC 105 or 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.
SA: MPH 206

301. Introductory Microbiology
Fall, Spring, 3(3-0) P: (BS 111 or LBS 145 or LBS 149H and (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.
SA: MPH 301

302. Introductory Microbiology Laboratory
Spring, 1(0-2) P: (MIC 105 or concurrently or MIC 205 or concurrently or MIC 301 or concurrently) Methodology of microbiology: microscopy, staining, aseptic technique, culture media, quantification, and laboratory safety.
SA: MPH 302

408. Advanced Microbiology Laboratory (W)
Fall, 3(1-6) P: (MIC 302 and MIC 431 or concurrently) and completion of Tier I writing requirement. R: Open only to students in the Department of Microbiology or LBS Environmental Biology/Microbiology or Microbiology coordinate major. 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.
SA: MPH 408

409. Eukaryotic Cell Biology
Spring, 3(3-0) P: (BS 111 or LBS 145 or LBS 149H and (BCH 401 or concurrently or BCH 462 or concurrently) Structure and function of nucleated cells. Emphasis on the molecular mechanisms that underlie cell processes.
SA: MIC 409, MPH 403

412. Prokaryotic Cell Physiology
Fall, 3(3-0) P: (MIC 201 and BCH 461 or concurrently) Prokaryotic cell structure and function. Growth and replication. Macromolecular synthesis and control.
SA: MIC 401, MPH 401

425. Microbial Ecology
Spring, 3(3-0) Interdepartmental with Crop and Soil Sciences. P: (MIC 301) Microbial population and community interactions. Microbial activities in natural systems, including associations with plants or animals.
SA: MPH 425

431. Microbial Genetics
Fall, 3(3-0) P: (MIC 301 or concurrently) Genetics of bacteria, their viruses, plasmids, and transposons. Emphasis on genetic principles.
SA: MIC 401, MPH 401

440. Food Microbiology
Spring, 3(3-0) Interdepartmental with Food Science. Administered by Food Science. P: (MIC 205 or MIC 301) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores.
Major groups of microorganisms of importance to the food industry. Emphasis on ecological, physiological, and public health aspects.
SA: MPH 440

441. Food Microbiology Laboratory
Spring, 3(3-0) Interdepartmental with Food Science. Administered by Food Science. P: (MIC 205 or MIC 301) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores.
Major groups of microorganisms of importance to the food industry. Emphasis on ecological, physiological, and public health aspects.
SA: MPH 440