

870. Wave Motion in Continuous Media I
Winter of even-numbered years. 4(4-0)
MTH 422, MMM 810 or approval of department.
 Linear and nonlinear waves in bounded and unbounded media. Reflection, refraction, diffraction. Dispersion. Shock and acceleration waves. Waveguides, acoustical and optical analogies. Application to elastic, viscoelastic, plastic and fluid media.

890. Special Topics
Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 9 credits. Approval of department.
 Special topics in mechanical engineering of current interest and importance.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

917. Advanced Heat Conduction
Winter of even-numbered years. 3(3-0)
M E 817 or CHE 826 or MTH 841.
 Exact analytical techniques including use of Green's function and integral transforms; approximate numerical methods; phase change problems; ablation; inverse heat conduction problems.

925. Mechanical Engineering Problems
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 9 credits. Approval of department.
 Analysis of advanced engineering problems involving design, thermodynamics, fluid dynamics, gas dynamics, space.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

MEDICAL TECHNOLOGY M T

College of Natural Science

110. Clinical Laboratory Science and Health Care Delivery
Winter. 2(2-0)
 The history and definition of medical technology, its diagnostic and therapeutic role in health care delivery, and its relationship to other allied health professions.

210. Exploration of the Disciplines of the Clinical Laboratory Sciences
Fall. 2(2-0) Sophomores in medical technology.
 Clinical laboratory disciplines including hematology, immunohematology, chemistry, microbiology, cytology, and histology through an examination of laboratory testing and its roles in the assessment, prevention, monitoring of health state.

211. Introduction to the Clinical Laboratory
Fall. 1(0-2) M T 210 or concurrently.
 Basic laboratory techniques in clinical microbiology, immunohematology, hematology, hemostasis, clinical chemistry and clinical microscopy.

300. Foundations of Laboratory Practices
Fall. 3(3-0) Clinical Laboratory Sciences majors.
 Quality assurance of clinical laboratory analysis.

400. Clinical Laboratory Sciences Educational Practices
Fall. 2(2-0) Clinical Laboratory Sciences majors, approval of Medical Technology Program.
 Development and implementation of educational programs for clinical laboratory personnel. Includes scope of CLS education, administration of programs and accreditation standards.

410. General Pathology
(PTH 404., M T 404.) Spring. 3(3-0)
ANT 316; PSL 432 or concurrently. Interdepartmental with the Department of Pathology.
 Features of lethal and sublethal cell injury and inflammation and repair process. Definition of the major causes of pathologic change with a consideration of specific associated diseases.

411. Basic Histopathology
Spring. 2(1-2) ANT 420, PSL 432; M T 410 or concurrently. Interdepartmental with the Department of Pathology.
 Microscopic examination of cell injury and death, inflammation and tissue repair. Pathologic tissue changes in diseases resulting from degenerative changes, abnormal metabolism, neoplasia, immunologic processes, infection, mechanical trauma and malnutrition.

412. Clinical Biochemistry
(BCH 412.) Winter. 3(3-0) BCH 401; CEM 162. Medical Technology and Clinical Laboratory Sciences majors.
 A comprehensive survey of clinical biochemistry; assessment of normal and pathologic physiology.

420. Hematology
Spring, Summer. 3(3-0) BCH 401, PSL 432.
 Physiology, pathophysiology and laboratory assessment of hematological states.

421. Hematology Laboratory
Spring, Summer. 1(0-2) or 2(0-4) M T 420 or concurrently.
 Laboratory techniques in hematology. Normal and abnormal blood cell morphology.

430. Immunohematology
Fall, Spring. 3(3-0) MPH 461.
 Genetics and immunology pertinent to blood group systems, antibody identification, and compatibility testing. Common practices of transfusion centers. Clinical correlations related to transfusion reactions and to hemolytic disease of the newborn.

431. Immunohematology Laboratory
Fall. 1(0-2) or 2(0-4) M T 430 or concurrently.
 Techniques relevant to practice of immunohematology. Special emphasis on blood typing, antibody screening and identification, compatibility testing, prenatal and postnatal testing, quality assurance and problem solving.

440. Clinical Microscopy and Hemostasis
Winter, Summer. 2(2-0) PSL 432, BCH 401.
 Renal physiology pertinent to the physical, chemical, and microscopic analysis of urine. The coagulation and fibrinolytic mechanisms including inherited and acquired diseases, laboratory testing and anticoagulant therapy.

441. Clinical Microscopy and Hemostasis Laboratory
Winter. 1(0-2) or 2(0-4) M T 440 concurrently.
 Routine urinalysis including the physical, chemical and microscopic examination. Semi-automated procedures for routine coagulation testing including prothrombin times, partial thromboplastin times, and factor assays.

451. Senior Seminar I
Fall. 3(3-0) Clinical Laboratory Sciences majors, approval of Medical Technology Program.
 Problem oriented learning approach to develop managerial, scientific and educational leadership for the clinical laboratory. Topics to include clinical chemistry, hematology, immunology, microbiology, hemostasis, quality control, instrumentation.

452. Senior Seminar II
Winter. 3(3-0) M T 451.
 Continuation of M T 451. Problems of increasing difficulty and based on additional topics in immunohematology and medical mycology.

453. Senior Seminar III
Spring. 3(3-0) M T 452.
 Continuation of M T 452. Problems of increasing difficulty and based on additional topics from medical parasitology.

461. Medical Immunology and Microbiology
Winter. 5(5-0) MPH 301, MPH 302. Students may not receive credit in both MPH 461 and MPH 427. Interdepartmental with and administered by the Department of Microbiology and Public Health.
 The immune system, cellular interaction of the in vitro and in vivo reaction, and associated immunopathology. Characterization of infectious agents and their pathogenic processes.

481. Clinical Chemistry
Fall, Winter, Spring, Summer. 6 credits. Clinical Laboratory Sciences majors, approval of Medical Technology Program.
 Application of the theory and technical skills of chemistry in a clinical laboratory.

482. Clinical Hematology
Fall, Winter, Spring, Summer. 5 credits. Clinical Laboratory Sciences majors, approval of Medical Technology Program.
 Application of the theory and technical skills of hematology in a clinical laboratory.

483. Clinical Immunohematology
Fall, Winter, Spring, Summer. 4 credits. Clinical Laboratory Sciences majors, approval of Medical Technology Program.
 Application of the theory and technical skill of immunohematology in a clinical laboratory.

484. Clinical Microbiology
Fall, Winter, Spring, Summer. 6 credits. Clinical Laboratory Sciences majors, approval of Medical Technology Program.
 Application of theoretical and technical aspects of clinical microbiology in a clinical laboratory.

**Descriptions — Medical Technology
of
Courses**

- 485. Clinical Immunology**
Fall, Winter, Spring, Summer. 1 credit. Clinical Laboratory Sciences majors, approval of Medical Technology Program. Application of theoretical and technical aspects of clinical immunology in a clinical laboratory.
- 486. Clinical Hemostasis**
Fall, Winter, Spring, Summer. 1 credit. Clinical Laboratory Sciences majors, approval of Medical Technology Program. Clinical experience in the area of hemostasis. Structured to achieve proficiency in psychomotor skills, instrumentation, quality assurance, test evaluation and comprehension of concepts and principal in coagulation.
- 487. Clinical Body Fluid Analysis**
Fall, Winter, Spring, Summer. 1 credit. Clinical Laboratory Sciences major, approval of Medical Technology Program. Application of the theory and technical skills used in the analysis of body fluids in a clinical laboratory.
- 495. Independent Study**
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 10 credits. Approval of department. Independent study including assigned reading and reviews of appropriate scientific periodicals.

MEDICINE

MED

College of Human Medicine

- 512. Infectious Diseases**
Spring. 4(3-3) MPH 511, or approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health. Infectious diseases of humans, including biology of the causative microorganism, epidemiology, pathogenesis, host-parasite relationships, clinical and laboratory diagnosis, and clinical management.
- 590. Special Problems in Medicine**
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Human Medicine students or approval of department. Each student will work under direction of a staff member on an experimental, theoretical or applied problem.
- 607. Ambulatory Care Clerkship**
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. FMP 602. Interdepartmental with the departments of Family Practice, and Pediatrics and Human Development. Administered by the Department of Family Practice. Outpatient experience, lasting an equivalent of 34 half-days and extending over a minimum of 26 weeks. Continuous and comprehensive patient care under supervision of appropriate physicians.
- 608. Internal Medicine Clerkship**
Fall, Winter, Spring, Summer. 2 to 18 credits. May reenroll for a maximum of 42 credits. FMP 602, approval of department. Based in community hospitals, this clerkship will stress interviewing skills, history, physical examination, along with problem solving and therapy, and care of the whole patient leading to independence in patient management.

- 609. Hematology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Development of skills in data collection, problem solving and management related to common hematologic disorders of children and adults.
- 610. Oncology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Development of skills in data collection, problem solving and management of the more prevalent cancers in children and adults.
- 611. Cardiology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. A clinical clerkship in which students evaluate in depth patients with cardiac diseases. This includes experiences with special diagnostic procedures including cardiac cuticularization, phonocardiography, echocardiography and electrocardiography.
- 612. Nephrology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Integrated concepts of renal physiology and pathophysiology of renal disease. Clinical experience.
- 613. Dermatology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Office based experience with a dermatologist to learn clinical skills in dermatology and develop observational and diagnostic skills in skin disease.
- 614. Medical Chest Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. A clerkship covering four aspects of chest diseases: tuberculosis, diagnosis, pulmonary function, and physiology. The student works with medical residents, utilizing outpatient and hospital facilities.
- 615. Gastroenterology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Referred patients with gastrointestinal problems are seen as either inpatients or outpatients. Many long term problems are followed. Patients with psychosocial problems are seen conjointly with Social Service.
- 616. Allergy Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Office and hospital based experience to learn and develop diagnostic skills in allergy with a review of basic therapeutics as they relate to allergic diseases.
- 617. Neurology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. A combined office and inpatient experience that will provide the student with an opportunity to learn the concepts of evaluation and management of neurological disease.

- 618. Infectious Disease Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Interdepartmental with the Department of Microbiology and Public Health. The clerkship emphasizes acquisition in depth of knowledge and skills essential in solution of clinical problems in infectious and immunologic diseases. Integrated basic science input is afforded through relevant seminars.
- 620. Endocrinology and Metabolism Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Clinical and/or clinical-research clerkship to allow the student to work closely with patients having endocrine diseases, electrolyte abnormalities, endocrine hypertension or diabetes mellitus.
- 626. Physical Medicine and Rehabilitation Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Experience in prescription writing for physical medicine procedures, occupational therapy and rehabilitation skills.
- 627. Rheumatology Clerkship**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. MED 608. Combined office and hospital consultative clerkship which develops diagnostic skills in areas of rheumatic diseases.
- 628. Advanced Internal Medicine Clerkship**
Fall, Winter, Spring, Summer. 2 to 18 credits. May reenroll for a maximum of 30 credits. MED 608. Clinical experiences which refine diagnostic and management skills in general internal medicine.
- 630. Emergency Medicine Clerkship**
Fall, Winter, Spring, Summer. 2 to 18 credits. May reenroll for a maximum of 18 credits. MED 608. Pathophysiology and other basic concepts will be used to explain the development of emergent conditions. Clinical diagnosis and treatment of emergencies seen in community emergency departments will be discussed.

**METALLURGY, MECHANICS,
AND MATERIALS
SCIENCE** **MMM**

College of Engineering

- 160. Engineering Communications**
(EGR 160.) Fall, Winter, Spring. 4(3-4) MTH 108 or MTH 111 or concurrently. Engineering graphics, descriptive geometry, freehand sketching, graphical, numerical and computer problem solutions. Written technical reports and oral technical presentations.
- 201. Introduction to Engineering Mechanics**
Fall. 4(4-0) PHY 237. Laws of mechanics governing the behavior of rigid and deformable bodies emphasizing how these laws influence engineering design. Extensive use of demonstrations.