430. Immunohematology
Fall, 3(0-0) 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) FSL 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 449 concurrently.
Routine urine analysis 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 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 myology.

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.

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 the theory and technical aspects of clinical microbiology in a clinical laboratory.

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 majors, 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.

840. Advanced Hemostasis
(PTH 840) Fall of even-numbered years. 2(2-0) M.S. candidates in Clinical Laboratory Science or approval of department. Interdepartmental with the Department of Pathology.
Physiology, pathophysiology and laboratory evaluation of hemostatic disorders.

899. Master’s Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approved of Medical Technology Program.

MEDICINE

College of Human Medicine

512. Infectious Diseases
Fall, Winter, Spring, Summer, 4(3-3) MPH 512, 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 department 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 802, 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 606.
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 606.
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 catheterization, 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.  

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 at either inpatients or outpatients. Many long term problems are followed. Patients with psychosomatic 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 therapies 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.  
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 18 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  

College of Engineering  

160. Engineering Communications  
Fall, Winter, Spring. 4(3-3) MTH 108 or MTH 111 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, Spring. 4(4-0) PHY 237.

Laws of mechanics governing the behavior of rigid and deformable bodies emphasizing how those laws influence engineering design. Extensive use of demonstrations.

205. Mechanics I  
Fall, Winter, Spring. 4(4-0) MTH 215 or concurrently.


211. Mechanics of Deformable Solids I  
Fall, Winter, Spring. 4(4-0) MTH 205, MTH 310 concurrently, MTH 215 concurrently.


215. Solid Mechanics Laboratory  
Fall, Winter, Spring. 1(0-2) MTH 211 concurrently.

Instrumentation, physical properties of materials, comparison of experiment and theory.

230. Introduction to Materials Science  
Spring. 4(4-0) Non-Materials Science majors only.

A qualitative survey of metals, ceramics, and polymers, and the relationship of electronic, molecular, and crystal structure to the physical, mechanical, thermal, electrical and magnetic properties.

250. Introduction to Metallurgy  
Fall, Winter, Summer. 4(3-3) CEM 141A, MTH 113.

Structure-property relationship in metals and alloys. Mechanical properties, crystal structure, phase diagrams, iron-carbon system. Laboratory includes mechanical property tests, heat treatment, microstructural observations.

270. Computer Graphics  
Fall. 3(3-0) MTH 660, CPS 120 or approval of department.

Use of computer controlled display systems for the solution of multidimensional problems.

306. Mechanics II  
Fall, Winter, Spring. 4(4-0) MTH 216, MTH 310.

Dynamics of particles and particle systems. Energy and momentum principles. Two and three dimensional rigid body dynamics.

330. Metallurgical Thermochemistry  
Fall. 3(3-0) CEM 162 or approval of department.


350. Mechanical Properties of Materials I  
Fall. 3(3-0) MTH 211, MTH 250.


351. Mechanical Properties of Materials II  
Winter. 3(3-0) MTH 350.


352. Mechanical Property Laboratory  
Spring. 1(0-5) MTH 350.

Laboratory experiments related to the topics covered in MTH 350.

360. Physical Metallurgy I  
Winter. 3(3-0) MTH 250.

Complex binary and ternary phase diagrams. Solidification structures, precipitation, clustering, order-disorder transformation. Recovery, recrystallization and grain growth.

361. Physical Metallurgy II  
Spring. 3(3-0) MTH 360.