921. Theory of Vibrations III

Spring of odd-numbered years, Summer. 4(4-0) MMM 920 or approval of department. Interdepartmental with and administered by the Department of Metallurgy, Mechanics and Materials Science.

Nonlinear oscillations. Resonance; subharmonics; self-sustained motions; stability. Methods of Poincare, van der Pol, etc. Random vibrations. Parametric excitations; stochastic processes; power spectra. Applications.

925. Mechanical Engineering Problems

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 9 credits. Approval of department.

Analysis of advanced engineering problems involving design, thermodynamics, fluid dynamics, gas dynamics, space.

942. Viscous Fluids

Fall of even-numbered years. 3(3-0) MMM 810 or CHE 841.

Exact solutions of Navier-Stokes equations, i.e., Oscillatory Motion, Laminar Jet, Converging Channel, etc.; Hydrodynamic Stability including free convection, surface tension, gravitational and free-surface instabilities, and Tollmien-Schlichting waves.

970. Wave Motion in Continous Media II

Spring of even-numbered years. 4(4-0) M E 870 or approval of instructor.

Continuation of M E 870.

999. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

MEDICAL TECHNOLOGY M T

College or Human Medicine College of Osteopathic Medicine

201. Medical Technology

Fall. 1(1-0) Approval of school.

Relationship of medical technology to medicine and research, and the necessary interaction with other paramedical sciences.

401. Seminar in Medical Technology

Spring. 1 credit. Juniors.

Acquaints students with the operation and administration of a hospital, the philosophy and understanding of the entire profession of medical technology.

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

Fall. 4(3-3) MPH 511, or approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Infectious diseases of man, including biology of the causative microorganism, epidemiology, pathogenesis, host-parasite relationships, clinical and laboratory diagnosis, and clincial 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.

608. Senior Medical Clerkship

Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 43 credits. Primary clerkship, third year Human Medicine students.

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. 1 to 17 credits. May reenroll for a maximum of 34 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. 1 to 17 credits. May reenroll for a maximum of 34 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. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.

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/Urology Clerkship

Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.

Integrated concepts of renal physiology and pathophysiology of renal disease. Clinical experience.

613. Dermatology Clerkship

Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.

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. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.

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. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.

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. 1 to 17 credits. May reenroll for a maximum of 34 credits. MED 608 and H M 602 or H D 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. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.

A combined office and in-patient 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. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602 and MED 608 or H D 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 imput is afforded through relevant seminars.

619. Clinical Pharmacology Clerkship

Fall, Spring. 4 credits. H M 602; MED 608 and H D 608.

Understanding and use of drugs; adverse effects; and misuse of drugs.

620. Endocrinology and Metabolism Clerkship

Fall, Winter, Spring, Summer. 4 to 8 credits. May reenroll for a maximum of 16 credits. H M 602.

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.

621. Computer Medicine Clerkship

Fall, Winter, Summer. 4 to 16 credits. May reenroll for a maximum of 16 credits. H M 602.

Learning BASIC computer language; preparing flow chart for elementary management of medical problem.

622. Diabetes and Metabolism Clerkship

Fall, Winter, Spring, Summer. 4 credits. H M 602; MED 608 and H D 608.

Clinical experience with diabetic patients and other related endocrine disorders.

624. Geriatrics Clerkship

Fall, Winter, Spring, Summer. 16 credits. H M 602; MED 608 and H D 608.

Exposure to a wide variety of geriatric medical problems.

626. Physical Medicine and Rehabilitation Clerkship

Fall, Winter, Spring, Summer. 4 to 8 credits. May reenroll for a maximum of 8 credits. H M 602; MED 608 and H D 608.

Experience in prescription writing for physical medicine procedures, occupational therapy and rehabilitation skills.

627. Rheumatology Clerkship

Fall, Winter, Spring, Summer. 4 credits. H M 602; MED 608 and H D 608.

Combined office and hospital consultative clerkship which develops diagnostic skills in areas of rheumatic diseases.

628. Internal Medicine Clerkship

Fall, Winter, Spring, Summer. 4 to 16 credits. May reenroll for a maximum of 16 credits. H M 602; MED 608 and H D 608.

Elective experiences in internal medicine.

630. Emergency Medicine Clerkship

Fall, Winter, Spring, Summer. 4 to 8 credits. May reenroll for a maximum of 8 credits. MED 608, H D 608 or SUR 608; H M 602. Interdepartmental with the Department of Surgery.

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

201. Introduction to Engineering Mechanics

Winter. 4(4-0) PHY 237. Interdepartmental with the Department of Engineering.

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

205. Mechanics I

Fall, Winter, Spring, Summer. 4(4-0) MTH 214 or concurrently.

Vector description of forces and moments. Two and three dimensional equilibrium problems. Statics of frames and machines. Friction. Shear and moments in beams and shafts.

211. Mechanics of Deformable Solids

Fall, Winter, Spring, Summer. 4(4-0) MMM 205; MTH 215, MMM 215 concurrently, for A E, C E, M E majors.

Deformable solids, stress and strain, principal axes, material behavior (elastic, plastic, viscoelastic, temperature dependent). Boundary value problems, torsion, beams. Instability, columns.

215. Solid Mechanics Laboraory

Fall, Winter, Spring, Summer. 1(0-2) MMM 211 concurrently.

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

230. Introduction to Materials Science

Spring. 4(4-0) Sophomores.

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.

306. Mechanics II

Fall, Winter, Spring, Summer. 4(4-0) MMM 205, MTH 215.

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

341. Materials Chemistry II

Winter. 4(4-0) CEM 361 or M E 311.

An integrated treatment of the physical chemistry of metals and engineering materials is presented in MMM 341 and MMM 342. Thermochemistry, solutions, phase equilibria; electrochemistry; corrosion; reaction kinetics in liquids and solids; diffusion; surface phenomena.

342. Materials Chemistry III

Spring. 4(4-0) MMM 341.

Continuation of MMM 341.

360. Physical Metallurgy I

Fall. 4(4-0) CEM 153 or approval of department.

Relationship of properties to microstructure as affected by solidification transformations in heterogeneous systems, cold work, recrystallization, and grain growth. Emphasis on the important commercial metals and alloys.

361. Physical Metallurgy II

Winter. 4(4-0) MMM 360.

Continuation of MMM 360.

370. Metals and Alloys I

Fall, Winter. 4(3-3)

Principles of physical metallurgy applied to engineering metals and alloys.

371. Metals and Alloys II

Winter. 3(3-0) MMM 370.

Continuation of MMM 370.

372. Metals and Alloys III

Spring. 3(3-0) MMM 371.

Continuation of MMM 371.

375. Failure Analysis

Spring. 3(3-0) Juniors and MMM 211.

Modes and causes of failure of mechanical components. Steps in analyzing failures are illustrated through individual projects. Field trip required.

380. Physical Metallurgy Laboratory I

Fall. 1(0-3) MMM 360 or concurrently.

First of an integrated sequence of laboratory courses designed to illustrate the parallel theory courses. Introduction to metallography, pyrometry, and testing of metals.

381. Physical Metallurgy Laboratory II

Winter. 1(0-3) MMM 380; MMM 361 concurrently.

Continuation of MMM 380.

382. Physical Metallurgy Laboratory III

Spring. 1(0-3) MMM 381.

Continuation of MMM 381.

400. Special Problems

Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department.

Individualized reading and research.

404. Dynamics of Mechanical Systems

Fall. 3(3-0) MMM 306.

Principles of Newtonian dynamics. Lagrangian dynamics of rigid-body systems. Introductory orbital mechanics. Euler's dynamical equations and gyroscopic notion. Engineering applications.

411. Mechanics of Deformable Solids II

Spring. 3(3-0) MMM 211.

Continuation of MMM 211. Unsymmetrical bending, curved beams, torsion of non-circular shapes, shear center, beam columns. Introduction to energy theorems with applications to determinate and indeterminate beams, and rings.

414. Principles and Techniques of Experimental Solid Mechanics

Spring. 3(3-0) MMM 211.

Fundamental concepts and current technology for static and dynamic measurement of strain and acceleration. Main topics discussed are resistance strain gages, photoelasticity, accelerometers, brittle coatings, Moire patterns, and holography.

430. X-Ray Cyrstallography

Fall. 4(3-3) MMM 342 or approval of department.

Symmetry, elementary crystallography, general properties of X-rays, introduction to radiation safety, interaction of X-rays with matter, application of X-ray diffraction to materials problems.

440. Color and Appearance of Materials

Spring. 3(3-0) Approval of department.

Color in art and technology; light and its interaction with colored materials; light sources and illuminants; color notation and classification; colored materials.

455. Advanced Physical Metallurgy I

Winter. 3(3-0) PHY 364 or approval of department.

Atomic theory of metals and alloys. Nature of chemical and metallic bonds. Lattice vibration and specific-heat theory. Relation of electron energy bands in metals to cohesion, structure, electrical and magnetic properties.

456. Advanced Physical Metallurgy II

Spring. 3(3-0) MMM 455.

Nature of interfaces. Driving forces and kinetics of phase transformation. Plastic deformation of single crystals and relationship to mechanical properties of metals and alloys. Strengthening mechanisms.