MECHANICAL ENGINEERING

College of Engineering

201. The Science of Sound I: Rock, Back and Oscillators
Winter. 3(3-0) or 4(4-0) Interdepartmental with and administered by the Physics Department.

202. The Science of Sound II
Spring. 3(3-0) or 4(4-0) PHYS 201.

255. Computer Models in Science and Engineering
Spring. 3(3-0) CPS 110 or 120 or equivalent FORTRAN. Interdepartmental with the Computer Science Department. Problem-solving: development of student's ability to formulate computable models based on finite physical elements, examples from statics, dynamics, electrical resistance, and conduction heat transfer.

280. Manufacturing Processes
Fall, Winter. 3(3-0)
An introduction to the materials and processes used in manufacturing, to convert ideas into products, machines, and structures for the use of mankind. Extensive use is made of audio-visual techniques.

300. Technology and Utilization of Energy
Fall. 3(3-0) Initial course in energy science sequence of courses in the Department of Natural Science. Interdepartmental with the Engineering Department.
Problems of energy technology and its impact; energy sources, conversion, use and environmental effects, future outlook for mankind.

303. Thermal-Fluid Phenomena
Spring. 3(3-0) MME 201 or approval of department.
Concepts and principles used to describe, predict or explain thermal and fluid-flow phenomena. Kinematic and momentum balances, conservation of energy, heat transfer, conduction, convection, and radiation. Fluid flow, heat transfer, steam and gas dynamics, boundary layer, turbulence, and similarity techniques.

311. Thermodynamics I
Fall, Winter, Summer. 3(3-0) MTH 215 or concurrently.
Fundamentals of thermodynamics. First and second laws of thermodynamics. Energy and entropy, equilibrium states, entropy concept. Applications of these to systems describable by two independent properties.

312. Thermodynamics II
Winter, Spring. 3(3-0) 311.
Continuation of 311. Gas and vapor relations, heat and mass transfer, properties of gases and vapors, applications to processes.
412. Heat Transfer II
Winter, Spring. 3(3-0) 333.
Natural and forced convection based on boundary layer theory. Heat transfer in fluids with phase change. Heat exchangers, mass transfer.

414. Energy Conversion
Winter. 3(3-0) 332.
Fundamental principles of energy conversion systems. Direct energy conversion, Thermoelectric, thermionic, nuclear, fuel cells, magnetohydrodynamic, and other methods of power generation.

416. Statistical Thermodynamics
(313.) Spring. 3(3-0) 311.

417. Propulsion
Spring. 3(3-0) 333.
Thermodynamics and fluid mechanics, theory and performance of reciprocating, turbine, propeller, propulsive engines, turbofans; thermodynamic cycles, component efficiencies, concepts in nuclear and radiation propulsion.

421. Machine Design I
Fall. 4(3-3) MME 211.
Analysis and synthesis of mechanical systems; fatigue resistance; stress concentration; non-linear elements.

422. Machine Design II
Winter. 3(3-2) 451.
Analysis and synthesis of elements of systems; hydrodynamic theory of lubrication; contact stresses; finite and infinite life design factors.

424. Dynamics of Machines
Winter. 3(3-0) 320.
Analysis of static and dynamic forces in rigid body systems; balancing of rotating and reciprocating system elements; inertial guidance; critical speeds.

426. Cooling Processes
Winter. 3(3-0) 312.
Thermodynamic principles applied to the design of cooling systems in range of normal temperature to ultra-low cryogenic temperature conditions. Psychrometric principles as applied to air conditioning and evaporating systems.

427. Machine Design III
Spring, Summer. 3(3-0) 421.

432. Refrigeration
Spring. 3(3-0) 436.
Characteristics of refrigerants; application details pertaining to comfort cooling, food refrigeration, and ultra-low temperature units; refrigeration controls, and control systems.

436. Psychrometric Winter, Spring.
Heat Transfer
Fall, Winter, Spring. 3(3-0) 311.

438. Control Theory
Spring. 4(4-0) 352.
Closed-loop control systems; application of transfer function analysis; design for a definite degree of stability; on-and-off controllers.

443. Computer Assisted Design
Spring. 3(2-2) 332, 411.

451. Flight Dynamics
Fall. 3(3-0) MME 306.
Particle and rigid body dynamics, vacuum trajectories, orbit theory, propellant mass, propulsion, longitudinal, directional and lateral static stability and control, dynamic stability and control, range, speed, payload, and altitude performance.

456. Kinematics of Machines II
Fall. 3(3-0) 320.
862. Mechanical and Aerospace
Optimization
Winter. 3(3-0) MTH 434.
Elementary fundamentals of calculus of variations, maximum principle. Optimization techniques applied to fluids, gas dynamics, optimization of airfoil shapes, fuel consumption, heat transfer, wave propagation in solids and physical properties in plasmas.

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

899. Research
(EGR 899.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

920. Theory of Vibrations II
(MMM 904.) Winter of odd-numbered years. 4(4-0) MTH 422; 523 or approval of department. Interdepartmental with and administered by the Metallurgy, Mechanics and Materials Science Department.

921. Theory of Vibrations III
(MMM 903.) Spring of odd-numbered years, Summer. 4(4-0) MMM 920 or approval of department. Interdepartmental with and administered by the Metallurgy, Mechanics and Materials Science Department.

925. Mechanical Engineering Problems
Fall, Winter, Spring, Summer. Variable credit. May re-enroll 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.

999. Research
(EGR 999.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

MEDICAL TECHNOLOGY

College of Human 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 re-enroll for a maximum of 10 credits. Approval of department.
Independent study including assigned reading and reviews of appropriate scientific periodicals.

MEDICINE

College of Human Medicine

512. Infectious Diseases
Fall. 4(3-2) MPH 511, or approval of department. Interdepartmental with and administered by the Microbiology and Public Health Department.
Infectious diseases of man, including biology of the microorganisms, immunology, 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 re-enroll 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.

605. Senior Medical Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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 re-enroll for a maximum of 34 credits. 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 re-enroll for a maximum of 34 credits. 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 re-enroll 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 catheterization, phonocardiography, echocardiography and electrocardiography.

612. Nephrology/Urology Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll for a maximum of 34 credits. H M 602.

613. Dermatology Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll for a maximum of 34 credits. H M 602.
Office based experience with a dermatologist to learn clinical skills, develop and detect observational and diagnostic skills in skin disease.

614. Medical Chest Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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 re-enroll for a maximum of 34 credits. H M 602.
Referral patients with gastrointestinal problems are seen as either in- or out-patients. 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 re-enroll for a maximum of 34 credits. 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 re-enroll 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 re-enroll for a maximum of 34 credits. H M 602 or M 608 or H D 608.
Interdepartmental with the Microbiology and Public Health Department.
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. 4 to 8 credits. May re-enroll 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.