952. *Slip and Free (Newtonian) Molecular Flows*

Spring. 3(3-0) 412, 432.

Distribution function; Boltzmann equation; solutions of Enskog-Burnett, Grad; slip flow; drag coefficient; heat transfer. Free molecule flow; elastic and inelastic reflections; flow around bodies; resistance coefficient; heat; oblation; meteors.

953. *Plasma Dynamics (Magneto-Gas Dynamics)*

Winter. 3(3-0) 432; PHY 491.

Fundamental equations of hydrodynamics; Maxwell equations; continuum; channel flow; boundary layer; shocks; Alfven wave propagation; one and two fluid theories; discrete particle approach; plasma oscillations; flow around bodies and in nozzles; space propulsion systems.

954. *Ion Flow Dynamics*

Spring. 3(3-0) 953.

Continuation of 953 as applied to the ion flow; extension of the neutral flow turbulence into electromagnetic turbulence, and method of characteristics applied to the ion flow dynamics.

999. *Research*

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

MEDICAL TECHNOLOGY M T

College of Human Medicine

College of Osteopathic Medicine

College of Veterinary 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*

Fall. 1 credit. Seniors.

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

MEDICINE MED

College of Human Medicine

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.

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. 17 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.

METALLURGY, MECHANICS AND MATERIALS SCIENCE MMM

College of Engineering

205. *Mechanics I*

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

Vector description of forces, moments, and motion. Statics. Dynamics of particles and particle systems. Energy and momentum principles. Stability of equilibrium.

206. *Mechanics II*

Fall, Winter, Spring, Summer. 4(4-0) 205; MTH 215 or concurrently.

Dynamics of rigid bodies in general motion, plane motion, rotation, statics, variational methods.

211. *Mechanics of Deformable Solids*

Fall, Winter, Spring, Summer. 4(4-0) 205 or statics; MTH 215.

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

215. *Materials Testing Laboratory*

Fall, Winter, Spring, Summer. 1(0-3)

Physical properties of engineering materials, resistance to primary types of static loading.

230. *Introduction to Materials Science*

Fall. 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.

304. *Dynamics*

Fall. 4(5-0) Statics; MTH 215 or concurrently.

Dynamics of particles and rigid bodies for those students who have had statics.

320. *Analytical Mechanics I*

Fall. 3(3-0) MTH 215; PHY 289.

Measures of point motion, indicial notation, vector space and time transformations. Newton's, Lagrange's and Hamilton's equations. Motions of point objects; limiting wave forms.

321. *Analytical Mechanics II*

Winter. 3(3-0) 320.

Schrodinger's equation. Particle motions in various potentials; hydrogen-like atoms and molecules. Continuum models of particle systems; tensor properties, rigid and elastic solids, transfer of heat and electricity, flow relations.

322. *Analytical Mechanics III*

Spring. 3(3-0) 321.

Quantum and statistical models of particle systems; the Maxwell-Boltzmann, Einstein-Bose and Fermi-Dirac distributions; analysis of ideal atomic, electron and photon gases; properties of dense gases and liquids; thermal, elastic and electrical properties of crystals.

340. *Materials Chemistry I*

(440.) Fall. 4(4-0) CEM 153.

An integrated treatment of the physical chemistry of metals and other engineering materials is presented by 340, 341 and 342. Physicochemical systems; thermodynamics and thermochemistry; equilibrium; solutions and phase equilibrium; electrochemistry; corrosion; reaction kinetics in condensed phases; diffusion; surface phenomena.

341. *Materials Chemistry II*

(441.) Winter. 4(4-0) 340 or approval of department.

Continuation of 340.

342. *Materials Chemistry III*

(442.) Spring. 4(4-0) 341.

Continuation of 340, 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) 360.

Continuation of 360.

362. *Physical Metallurgy III*

Spring. 4(4-0) 360, 361.

Continuation of 360, 361.

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) 370.

Continuation of 370.

372. *Metals and Alloys III*

Spring. 3(3-0) 371.

Continuation of 371.

380. *Physical Metallurgy Laboratory I*

Fall. 1(0-3) 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) 380; 361 concurrently.

Continuation of 380.

382. *Physical Metallurgy Laboratory III*

Spring. 1(0-3) 381; 362 concurrently.

Continuation of 381.

400. *Special Problems*

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

Individualized reading and research.

404. *Dynamics of Mechanical Systems*

Fall. 3(3-0) 206.

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) 211.

Continuation of 211. Unsymmetrical bending,