MECHANICAL & MATERIALS ENG (MMEG)

MMEG 21000 - Engineering Mechanics: Statics (3)
Statics is the study of particles and rigid bodies in equilibrium, meaning they have no unbalanced forces or torques acting on them. This course covers force and moment vectors, distributed loads, centroids, moments of inertia, friction, virtual work, particle equilibrium, and rigid body equilibrium in two and three dimensions. These concepts are applied toward the analysis of trusses, frames, machines, and beams.
Prerequisite: PHYS 21000 and MATH 23500 (may be taken concurrently)

MMEG 21100 - Engineering Mechanics: Dynamics (3)
Dynamics is the study of an object or system in motion under the influence forces. This course covers kinematics of particles and rigid bodies in two and three dimensions; the relationship between force, mass, and acceleration; work and energy; impulse, and momentum.
Prerequisite: MATH 23500 and MMEG 21000

MMEG 21200 - Mechanics of Materials (3)
This course covers the mechanics of deformable elastic and inelastic bodies with emphasis on analyzing stresses, strains, and deflection and deformation in machine and structural elements (axial, shear, torsion and bending loads). Combined loading, buckling, failure criteria, and design concepts will also be discussed.
Prerequisite: MMEG 21000

MMEG 33000 - Materials Science (3)
This course covers the scientific principles determining the structure of metallic, polymeric, ceramic, semiconductor and composite materials; electronic structure, atomic bonding, atomic structure, microstructure and macrostructure. The basic principles of structure-property relationships are covered in the context of chemical, mechanical, and physical properties of materials. This course includes several laboratory sessions.
Prerequisite: CHEM 11000 and PHYS 21800

MMEG 34000 - Fluid Mechanics (3)
This course provides an introduction to fundamentals of fluid statics, integral form and control volume analysis, Bernoulli's Theorem, differential analysis and potential flow, incompressible viscous internal and external flow, application of Navier-Stokes equations, and compressible flow. Applications include flow in pipes and air foils. This course includes several laboratory sessions. MATH 30000 and either MMEG 21100 or PHYS 30000 are recommended prerequisites.
Prerequisite: MATH 25000 and PHYS 21800

MMEG 35000 - Engineering Thermodynamics (3)
This course covers principles of thermal energy conversion; properties of pure substance; work and heat; zeroth law of thermodynamics, first law of thermodynamics, control volume, steady state and steady flow process, uniform state and uniform flow process; second law of thermodynamics, entropy, power and refrigeration cycles.
Prerequisite: MATH 25000 and PHYS 21800

MMEG 35500 - Heat and Mass Transfer (3)
This course covers the fundamentals of heat transfer by conduction, convection, and radiation and mass transfer by convection. Topics include steady and transient heat conduction in solids, forced and free convection in fluids, properties of thermal radiation, radiation heat transfer between solids, and applications like heat exchangers.
Prerequisite: MMEG 35000