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Course Descriptions ME

EGPP-101 Introduction to Engineering, 2 Credits

Provides information on engineering education, the engineering profession, and basic concepts and tools. Introduces the engineering design process and provides the opportunity for students to complete engineering design projects.

MEEG-103 Introduction to Computer Aided Design, 2 Credits

Introduction to engineering drawing and descriptive geometry, space visualization and coordinate systems, conventions, projection drawings, freehand sketching, vectors, and graphical mathematics. Freehand, instrument, and computer techniques are used.

MEEG-204 Solid Mechanics, 3 Credits

Presents basic concepts of stress and strain of deformable bodies, state of stress and strain, Mohr's circle, and bending of prismatic bars, among other topics.

MEEG-206 Solid Mechanics Lab, 1 Credit

Experiments designed to expose students to experimental techniques applicable in evaluation of the mechanical properties of materials including measurement of static and dynamic properties.

MEEG-207 Introduction to Engineering Computations, 3 Credits

Introduces programming with computers. Programming concepts include procedural thinking, algorithm development, and techniques for developing solutions to engineering problems using software packages such as MATLAB.

MEEG-209 Material Science, 3 Credits

Correlation of the structure of metals, ceramics, and organic materials with their mechanical and physical properties; control of properties by modifying the microstructure, and stability of materials in service environments.

MEEG-301 System Dynamics, 3 Credits

Introduction to modern control theory, including digital control and nonlinear system analysis. Mathematical modeling of physical systems with mechanical, fluid, thermal and/or electrical elements. Classical feedback control theory and design, and their application to practical electromechanical and aerospace problems.

MEEG-304 Thermodynamics, 3 Credits

Presents basic thermodynamic concepts and definition, laws of thermodynamics, properties of pure substances, and entropy and availability. Introduction to statistical thermodynamics.

MEEG-306 Applied Thermodynamics, 3 Credits

Study of mixtures, combustion, power cycles, gas turbines, and compressors; reciprocating engines, refrigeration, and reactive systems. Introduction to Onsager's relations and direct energy conversion. Laboratory work included.

MEEG-307 Fluid Mechanics I, 3 Credits

Includes properties and mechanics of fluids; kinematics; and control volume continuity, momentum, and moment of momentum equations.

MEEG-310 Mechanical Design I, 3 Credits

Integration of knowledge of strength of materials in a design context, stress and deflections in engineering structures. Theories of failure. Introduction to the design of machine components, such as screws, fasteners, bolts, welded joints, shafts, axles, and mechanical springs.

MEEG-311 Mechanical Design II, 3 Credits

Discusses frictional and wear considerations in design of mechanical systems. Also covers design of rolling contact bearing, journal bearings, spur, helical, bevel, and worm gears, clutches and brakes, flexible mechanical elements; hydrodynamic lubrication.

MEEG-316 Instrumentation and Experimentation Lab, 2 Credits

Basic principles of instruments and sensors employed in engineering measurements. Nature of experimental error and uncertainty analysis.

MEEG-319 Manufacturing, 3 Credits

Discusses major groups of manufacturing processes which consist of casting, forming, machining and joining processes. Each group of manufacturing processes includes several manufacturing techniques for producing diverse manufactured parts. Also, manufacturing processes for a competitive environment will be introduced. These processes include automation in manufacturing and computer-integrated manufacturing.

MEEG-320 Fluid Mechanics II, 3 Credits

Covers the fundamental physical concepts related to external flow. Students will demonstrate necessary problem-solving skills to solve basic engineering problems in fluid and aero systems in which fluid analysis is necessary.

MEEG-350 Computer Aided Engineering, 3 Credits

Theory and application of computer aided engineering based on FEA and CFD codes for the modeling, simulation and analysis of mechanical engineering systems.

MEEG-403 Heat Transfer, 3 Credits

Analytical and numerical treatment of heat transfer by conduction, convection, and radiation; steady and unsteady state heat flow; condensing vapors; and boiling liquids.

MEEG-423 Thermal/Fluid Science Lab, 1 Credit

Experiments designed to expose students to experimental techniques applicable in evaluation of the behavior fluid and thermal systems.

MEEG-441 Senior Project I, 3 Credits

Independent team design study of current interest under supervision of faculty members. Report must be submitted for review by mechanical engineering faculty before graduation.

MEEG-442 Senior Project II, 3 Credits

Team design study. Continuation of MEEG-441. Prerequisite: MEEG-441.

Technical Electives

MEEG-308 Aerofluid Dynamics, 3 Credits

Potential flow theory and compressible flow; circulation, vorticity and wing theory, shock waves, expansion waves and nozzles; introduction to boundary layer theory and applications.

MEEG-318 Jet Propulsion, 3 Credits

Power cycles, combustion fundamentals, aircraft and missile propulsion, engines compressors and turbines.

MEEG-416 Aerostructures, 3 Credits

Static analysis of aerospace structures; external loading and environment; failure theories of materials; deflection of unsymmetrical cross-section beams; thermal stress; torsion of thin-walled sections; stiffened shell structures, buckling of columns and plates; introduction to dynamic analysis.

MEEG-418 Vibration Analysis, 3 Credits

Covers single DOF, two DOF and multi-DOF systems of vibration analysis, mode shape functions, numerical solutions and software packages.

MEEG-421. Product Data Management, 3 Credits

Participants will study topics fundamental to global collaborative engineering, product data management, and collaborative product data management. These topics will be applied during team projects utilizing state of the art collaborative engineering and product data management software and hardware technologies. This course may also contain live online video lectures originating from participating universities.

MEEG-438 Environmental Control, 3 Credits

Analysis and design of heating, cooling, ventilation, and air distribution systems, including physiological and climatic factors, along with such new concepts of thermal systems as solar energy, total energy, and energy conservation.

MEEG-443 CAD/CAM, 3 Credits

Fundamentals of computer graphics and introduction to computer aided design software and solid modeling. Fundamentals of machining, numerical control and numerical control programming. Laboratory provides hands on experience in computer integrated manufacturing and CNC milling and turning.

MEEG-444 Robotics, 3 Credits

Kinematics and dynamics of robot manipulators, robot programming languages, structural members; fatigue, creep, and stress team or design study of current interest.

MEEG-445 Undergraduate Research I, 3 Credits

Analysis, design and/or experimentation in Instructor's area of interest.

MEEG-447 Computational Fluid Dynamics, 3 Credits

Solutions to fluid flow problems using computers. Students will gain familiarity with numerical methods and acquire experience in solving fluid mechanics and heat transfer problems using computers.

MEEG-450 MEMS, 3 Credits

Various topics related to Microelectromechanical systems (MEMS) are covered in the class. Those topics are

comprised of but not limited to micro-sensors, micro-actuators, optomechanical devices, and labs-on-a-chip.

MEEG-461 Energy Engineering I, 3 Credits

Introduction to modern energy sources useful for engineering applications. Includes fossil, nuclear, solar, wind, geothermal and biomass.

MEEG-462 Energy Engineering II, 3 Credits

Analysis of current practices governing use of energy sources. Effective utilization and economic considerations are discussed. New and emerging technologies (such as synfuels and cogeneration) are discussed.

MEEG-990/991 Co-op Mechanical Engineering, 1-12 credits

For students enrolled in the Cooperative Education Program during time spent in industry. Credit may be awarded based on evaluation of employer(s) and a written report by the student.