Mechanical Engr (ME)

Courses

ME 1105 Solid Modeling: 2 semester hours.
Introduction to the fundamentals of Solid Modeling. Sketching, features, modeling, assemblies and drawings. Minimum grade C-. PREREQ: MATH 1147. F, S

ME 1150 Engineering Marvels and Civilizations: 3 semester hours.
Introduces engineering and scientific discoveries from different cultures and countries and their contributions to society. It identifies historical milestones in the advancement of engineering and its connections to societal and cultural developments. It presents the problematization and conceptualization of engineering as a societal and cultural phenomenon. Satisfies Objective 9 of the General Education Requirements. F, S

ME 1165 Structured Programming: 2 semester hours.
Introduces concepts of structured programming via top-down design concepts, in an interpreted programming environment. Covers conditionals, loop structures, function modules, array processing, structures, input and output of data, and graphical visualization, with applications to engineering problems. Minimum grade C-. PREREQ: MATH 1170. F, S

ME 1199 Experimental Course: 1-6 semester hours.
The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

ME 2210 Engineering Statics: 3 semester hours.
Concepts of force vectors and equilibrium with emphasis on free body diagrams. Trusses, beams, frames, centroids, fluid statics, and friction. Equivalent to CE 2210. PRE-or-COREQ: CE 1105 or ME 1105 (Minimum grade of C- or better required for ME 1105); PHYS 2211; and MATH 1175. F, S

ME 2220 Engineering Dynamics: 3 semester hours.
Principles of kinetics. Angular and linear displacement, velocity, and acceleration analysis. Rigid bodies in motion and types of motion. Application of principles of force-mass acceleration, work-kinetic energy, and impulse-momentum to solution of problems of force systems acting on moving particles and rigid bodies. Equivalent to CE 2220. PREREQ: ME 2210 or CE 2210, PHYS 2211, CE 1105 or ME 1105, and MATH 1175. F, S

ME 2266 Symbolic Programming: 1 semester hour.
Introduces a symbolic programming language, with emphasis on algebraic, calculus, and linear algebraic manipulations and visualization, with engineering applications. PREREQ: MATH 1175. PRE-or-COREQ: ME 1165 (Minimum grade of C- or better required for ME 1165) and MATH 2240. S

ME 2299 Experimental Course: 1-6 semester hours.
The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

ME 3307 Thermodynamics: 3 semester hours.
Fundamental concepts of thermal energy equations. Applications to ideal and real gases, liquids, and solids in static and transient systems. PRE-or-COREQ: MATH 2275. PREREQ: ME 2220. F, S

ME 3320 Kinematics and Dynamics of Machinery: 3 semester hours.
Kinematic analysis of cams, gears, and linkages; velocity, acceleration and force analysis; kinematic synthesis and design of mechanisms; balancing; computer-aided analysis and synthesis. PRE-or-COREQ: MATH 2275. PREREQ: ME 1165, ME 2220, and MATH 2240. F

ME 3322 Mechanical Engineering Materials: 3 semester hours.
Material properties, metals, alloys, phase diagrams, heat treatment, material testing and material applications. PRE-or-COREQ: CE 3350 or ME 3350. PREREQ: CE 2210 or ME 2210, MATH 1175, CHEM 1111 and CHEM 1111L. F, S

ME 3323 Machine Design: 3 semester hours.
Design of mechanical components subject to static and fatigue loads. Design using screws, fasteners, springs, bearings, and welds. Computer-aided design using finite element methods. PREREQ: CE 3350/ME 3350. PRE-or-COREQ: ME 3322 and ME 3320. F

ME 3325 Advanced Machine Design: 3 semester hours.
Statistical methods for design, failure analysis, advanced machine component design. PREREQ: ME 3320 and ME 3323. S

ME 3341 Fluid Mechanics: 3 semester hours.
Fluid statics, incompressible fluid flow, open channel flow, compressible fluid flow, pipe flow, flow measurements, pumps, valves, other devices. Equivalent to CE 3341. PREREQ: ME 2220 and MATH 3360. F, S

ME 3350 Mechanics of Materials: 3 semester hours.
Theories of stresses and strains for ties, shafts, beams, columns and connections. Determination of deflections and the investigation of indeterminate members. An introduction to design. Equivalent to CE 3350. PREREQ: CE 2210 or ME 2210, PHYS 2211, CE 1105 or ME 1105, and MATH 1175. F, S

ME 3353 Manufacturing Processes: 3 semester hours.
Production techniques and equipment. Casting, molding, pressure forming, metal removal, joining and assembly, automation and materials handling. Field Trips. PREREQ: ME 3322. D

ME 3355 System Dynamics: 3 semester hours.
Modeling and representations of dynamic 3-dimensional physical systems emphasizing rigid bodies: transfer functions, block diagrams, state equations. Transient response. PREREQ: ME 2220 and MATH 3360. D

ME 3399 Experimental Course: 1-6 semester hours.
The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

ME 4405 Measurement Systems Design: 3 semester hours.
Introduction to instrumentation systems analysis and design, including statistical analysis, system modeling, actuators, transducers, sensor systems, signal transmission, data acquisition, and signal conditioning. PREREQ: MATH 3360. D

ME 4406 Measurement Systems Laboratory: 2 semester hours.
Principles of measurement, measurement standards and accuracy, detectors and transducers, digital data acquisition principles, signal conditioning systems and readout devices, statistical concepts in measurement, experimental investigation of engineering systems. PREREQ: MATH 3360, PHYS 2212, and ME 2220/CE 2220 or Instructor Approval. S

ME 4415 Model Theory: 3 semester hours.
Theory of design and testing of scaled system models. Dimensional analysis with application to physical models. True and distorted models, linear and nonlinear models and analogies. Laboratory work required. PREREQ: ME 3341 and CE 3350/ME 3350. D

ME 4416 Thermal Power Cycles: 3 semester hours.
Application of thermodynamics to design of systems for conversion of thermal energy to power by various power cycles. PREREQ: ME 3307. D

ME 4421 Engineering Modeling, Analysis, & Simulation: 3 semester hours.
Covers modeling engineering systems from first principles, dimensional analysis, stability, approximation techniques, numerical simulations, handling uncertainty in models. PREREQ: MATH 2240, MATH 2275, MATH 3360, ME 2220/CE 2220, or permission of instructor. D

ME 4424 Introduction to Robotics: 3 semester hours.
Overview of robotic systems. Kinematics, dynamics and motion planning for serial, parallel, and mobile robots. Motion simulation, control, and programming. Prereqs: ME 1165 or CS 1181(for EE students), MATH 2240, PHYS 2211

ME 4425 Mechatronics: 3 semester hours.
Basic kinematics, sensors, actuators, measurements, electronics, microprocessors, programmable logic controllers, feedback control, robotics and intelligent manufacturing. PRE-or-COREQ: ME 4406 or ECE 4410 and PREREQ: MATH 3360. D

ME 4435 Computer Simulation: 3 semester hours.
Basic Finite Element Analysis (FEA), Excel and SolidWorks simulation for static and dynamic analysis of mechanical design components, and thermal fluid systems analysis. PREREQ: ME 4476, ME 4440, permission of instructor. D

ME 4437 Computer Simulation II: 3 semester hours.
Advanced Finite Element Analysis (FEA) using CAD (SolidWorks?) simulation software for static and dynamic analysis of mechanical design components, and thermal fluid systems analysis. PREREQ: ME 4435 or permission of instructor. D

ME 4440 Vibration Analysis: 3 semester hours.
Free vibration and forced response of single and multiple degree of freedom systems, normal modes, random vibrations, discrete, lumped mass, and continuous systems. Vibration control techniques. PREREQ: MATH 2275 and MATH 3360. PRE-or-COREQ: ME 3323. F

ME 4443 Thermal Fluids Laboratory: 1 semester hour.
Measurement of thermal and fluid properties, experiments on fluid flow and heat transfer systems. PREREQ: ME 3307, CE/ME 3341, and ME 4476. F

ME 4451 Compressible Fluid Flow: 3 semester hours.
Fundamentals and practical applications of compressible fluid flow and gas dynamics; techniques for isentropic friction, heat addition, isothermal flow, shock wave analysis, propagation, expansion waves, reflection waves. PREREQ: ME 3307 and ME 3341. D

ME 4453 Process Engineering: 3 semester hours.
Covers engineering process planning and evaluation, quality control methods, and continuous improvement planning and implementation. PREREQ: ME 3322 or Permission of instructor.

ME 4463 Mechanical Systems Design: 3 semester hours.
Application of engineering concepts and principles to the design of mechanical systems, including economic, environmental, sustainability, and societal considerations. PREREQ: ME 3320, ME 3323, ME 3325, and ME 4440. S

ME 4464 Engineering Numerical Techniques: 3 semester hours.
Numerical methods for solving linear and nonlinear systems of equations, data fitting and smoothing, numerical integration and differentiation, initial and boundary value problems, and optimization. Stresses engineering applications and programming projects. PREREQ: ME 1165, MATH 2240, MATH 2275, and MATH 3360. D

ME 4465 Thermal Fluid System Design: 3 semester hours.
Application of engineering concepts and principles to the design of thermal and fluid systems, including economic, environmental, sustainability, and societal considerations. PREREQ: ME 3307, CE 3341/ME 3341, and ME 4476. F

ME 4473 Mechanical Control Systems: 3 semester hours.
Discrete and continuous time control system design, signal processing, embedded systems. PREREQ: ME 2220/CE 2220, PHYS 2212, MATH 3360, and ME 4440, PRE-or-COREQ: ME 4406. S

ME 4476 Heat Transfer: 3 semester hours.
Principles and engineering applications of heat transfer. Analysis of conduction, convection and radiation heat transfer. Design of heat exchangers. PREREQ: ME 3307. PRE-or-COREQ: CE 3341/ME 3341. S

ME 4480 Mechanical Engineering Seminar: 1 semester hour.
Project management, conceptual design, industry interaction, current topics in Mechanical Engineering. PREREQ: Approval of application for admission to course. F

ME 4481 Independent Problems: 1-3 semester hours.
Students are assigned to, or request assignment to, independent problems on the basis of interest and preparation. May be repeated for a maximum of 6 credits. PREREQ: Permission of instructor. D

ME 4495 Mechanical Engineering Practice: 1 semester hour.
For students who have an approved internship. A final report is required including a discussion of the following elements: detailed description of internship project, project management skills developed, engineering design performed. PREREQ: Approval of internship application. D

ME 4496 Project Design: 3 semester hours.
The course is designed to give student teams experience solving an engineering problem involving the synthesis of a solution to meet the specified design requirements. PREREQ: CE 3360. S

ME 4496A Project Design I: 3 semester hours.
Semester one of a two semester sequence dealing with the conceptual design of multi-disciplinary projects requiring multi-disciplinary teams. PREREQ: Approval of application for admission to course. PRE-or-COREQ: CE 3360 or CE 3361. F

ME 4496B Project Design II: 3 semester hours.
Continuation of design sequence dealing with the design, analysis, implementation, and consequences of multi-disciplinary projects. PREREQ: ME 4496A. S

ME 4499 Experimental Course: 1-6 semester hours.
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