Mechanical Engr (ME)

Courses

ME 5505 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.

ME 5506 Measurement Systems Laboratory: 1 semester hour.
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. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: MATH 3360 and EE 2240.

ME 5515 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 non-linear models, and analogies. Laboratory work required. PREPREQ: ME 3341 and CE/ME 3350.

ME 5521 Engineering Modeling, Analysis, and Simulation: 3 semester hours.
Covers modeling engineering systems from first principles, dimensional analysis, stability, approximation techniques, numerical simulations, handling uncertainty in models. PREQ: MATH 2240,2275,3360, ME/CE 2220, or permission of instructor.

ME 5524 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. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: ME 1165 or CS 1181 (for EE students), MATH 2240, PHYS 2211. D

ME 5525 Mechatronics: 3 semester hours.
Basic kinematics, sensors, actuators, measurements, electronics, microprocessors, programmable logic controllers, feedback control, robotics and intelligent manufacturing. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. Equivalent to EE 5525. PRE-OR-COREQ: ME 4473 or EE 4473; and PREREQ: MATH 3360.

ME 5535 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. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: ME 4476, ME 4440, permission of instructor. D

ME 5540 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 3360. PRE-OR-COREQ: ME 3323.

ME 5551 Compressible Fluid Flow: 3 semester hours.
Fundamentals of compressible flow and gas dynamics, development of basic principles, practical applications. Techniques developed for isentropic friction, heat addition, isothermal flow, shock wave analysis, propagation, expansion waves, reflection waves. PREREQ: ME 3307 and CE/ME 3341.

ME 5564 Engineering Numerical Techniques: 3 semester hours.
Numerical methods for solving linear and nonlinear systems of equations, data fitting and smoooothing, numerical integration and differentiation, initial and boundary value problems, and optimization. Stresses engineering applications and programming projects. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: ME 1165 or CS 1181; MATH 2240, MATH 2275, and MATH 3360.

ME 5568 Behavior of Composite Materials: 3 semester hours.
Macro and micromechanical behavior of laminae and laminates bending, buckling and vibration of laminated beams and plates. Equivalent to CE 5568. PREREQ: ENGR 3350.

ME 5573 Mechanical Control Systems: 3 semester hours.
Discrete and continuous time control system design, signal processing, embedded systems. PREREQ: ME 2220, ee 2240, and MATH 3360, or equivalent.

ME 5599 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 6607 Advanced Thermodynamics: 3 semester hours.
Thermodynamic property relationships, gas mixtures, thermodynamic optimization, irreversible thermodynamics, constructual theory, applications towards solar power, power generation, and refrigeration systems. PREREQ: MATH 3360 and ME 4416.

ME 6635 Transport Phenomena: 3 semester hours.
Systematic and parallel treatment of heat transfer, mass transfer, and momentum transfer (viscous flow). PREREQ: ME 4476, ME 3341, and MATH 3360. RECOMMENDED: MATH 5521.

ME 6640 Advanced Vibrations: 3 semester hours.
Vibrational theory of continuous, multiple-degree-of-freedom systems, and random vibrations. Use of advanced numeric techniques. COREQ: ENGR 5521 or MATH 5521. PREREQ: ME 5540 or ME 4440.

ME 6644 Advanced Kinematic Design: 3 semester hours.
Application of kinematic synthesis theory to the design of planar and spatial articulated systems. Finite-position precision synthesis, trajectory and workspace optimization and motion analysis for planar, spherical and spatial open and closed-loop chains. PREREQ: MATH 2240 and ME 3320.

ME 6648 Robotic Grasping/Manipulation: 3 semester hours.
Theoretical issues for multi-fingered robotic hands. Grasp analysis, grasp synthesis, mechanics of manipulation, path planning. Screw theory, twists and wrenches. Study of robotic hands and related sensing devices. PREREQ: MCE 6649 or permission of instructor.

ME 6650 Thesis: 1-9 semester hours.
Thesis research must be approved by the student's advisory committee. Six credits may be used to satisfy the research requirements for the degree. Graded S/U. May be repeated.

ME 6652 Special Problems: 1-3 semester hours.
Special experimental, computational, or theoretical investigation leading to development of proficiency in some area of engineering. Formal report required. PREREQ: PRIO Project Approval Required by an Engineering Faculty. May be graded S/U. May be repeated.

ME 6660 Special Project: 1-9 semester hours.
A significant project, involving engineering applications, toward the completion of M.S. program with non-thesis option. Includes a report and oral examination. Graded S/U. May be repeated.

ME 6665 Finite Element Methods: 3 semester hours.
Introduction to finite element methods applied to linear one- and two-dimensional problems. Application of the concept to specific problems in various fields of engineering and applied sciences. Equivalent to CE 6665. PREREQ: ENGR 3350 and MATH 3360.

ME 6676 Conduction Heat Transfer: 3 semester hours.
Single and multiple dimension steady and unsteady conduction heat transfer. Non-constant thermal conductivity. Emphasis on problem formulation, analytical solutions, and numerical techniques. COREQ: MATH 5521. PREREQ: ME 4476.

ME 6699 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 8850 Doctoral Dissertation: 1-24 semester hours.
Research toward completion of the dissertation for the Ph.D. in Engineering and Applied Science. Variable credits. May be repeated. Graded S/U.