

MECHANICAL ENGINEERING TECHNOLOGY (ETME)

ETME 2305. Engineering Analysis Methods. 3 Hours. [TCCN: MATH 2414]

Students learn modeling and analysis of engineering systems that contain mechanical, electrical, thermal, and fluid components. Both steady and dynamic state models involving applications of analysis tools such as integration, differentiation, matrices, and statistics will be introduced.

Prerequisite: ETEC 1010 and MATH 1420.

ETME 3320. Mechatronics. 3 Hours.

Students learn mechatronics design process, fundamentals of microcontrollers, embedded systems programming, actuator control, and sensor interfacing. Students gain hands-on experience in building mechatronics systems with practical applications.

Prerequisite: ETEE 1340 and ETME 2305.

ETME 3376. Engineering Dynamics. 3 Hours.

Students learn engineering mechanics regarding the motion of bodies under the action of forces. Topics may include kinematics, force-momentum formulation for systems of particles and rigid bodies in planar motion, work-energy concepts, virtual displacements and virtual work, Lagrange's equations for systems of particles, linearization of equations of motion, and free and forced vibration in mechanical systems.

Prerequisite: ETEC 3375, MATH 1420, PHYS 1301, and PHYS 1101.

ETME 3378. Applied Fluid Mechanics. 3 Hours.

Students learn principles of fluid mechanics, including both statics and dynamics, and their application to engineering systems. Topics may include properties of fluids, viscosity of fluids, pressure measurement, forces due to static fluid, buoyancy and stability, the Bernoulli equation, Reynolds number, various pipeline systems, selection and application of pumps, and flow measurements.

Prerequisite: ETME 2305 and PHYS 1301 and PHYS 1101.

ETME 4376. Applied Thermodynamics. 3 Hours.

Students learn the fundamentals of gas concepts, gas measuring devices, and calibration of measuring instruments. Topics may include vapor and gas cycles, ideal gas mixtures, reading of psychrometric charts, determining fuel combustion efficiency of a steam generating system, and measuring or analyzing humid air and steam conditions including heat content. Concepts of Rankine cycle as the basis for steam and heat engine operations will also be discussed.

Prerequisite: ETME 2305, PHYS 1301, and PHYS 1101.

ETME 4378. HVAC Systems. 3 Hours.

Students study the concepts of heating, refrigeration, and air conditioning technology and associated systems. Topics may include heat transfer, controls, electric motors, refrigeration and air-conditioning, chilled-water systems, domestic and commercial Heating, Ventilation, and Air Conditioning (HVAC) systems. Hardware and equipment such as condensers, compressors, evaporators, and expansion devices, as well as safety, tools, equipment, and shop practices may also be discussed. Course Equivalents: ETEC 4378

Prerequisite: ETME 3378.

ETME 4380. Applied Finite Element Method Analysis. 3 Hours.

Students learn a numerical analysis technique called the Finite Element Method (FEM) to obtain approximate solutions to complex engineering problems. Topics include linear static, structural, modal, thermal, and contact engineering problems. Selected advanced topics including implementing FEM in engineering design and optimization are discussed.

Prerequisite: ETME 2305 and ETEC 3367.

ETME 4385. Mechanical Design. 3 Hours.

Students learn principles of mechanical components design, theories of failure, fatigue and fracture design criteria, materials and their selection for engineering applications, and design of machine components such as fasteners, springs, and bolts.

Prerequisite: ETDD 4388, ETME 2305, and ETEC 4376.