As of January 2005

Engineering Technology

Course Descriptions

ENTC 1203. 2 sem. hrs. (1:3)
INTRODUCTION TO ENGINEERING TECHNOLOGY
Engineering technology careers; professional and ethical responsibilities; technical laboratories and skills; solving engineering problems; health and safety issues; environmental issues; overviews of industrial equipment; plant tours. Prerequisite: None. Fall, Spring.

ENTC 1304. 3 sem. hrs. (2:3)
ENGINEERING DESIGN GRAPHICS I
Introduction to teamwork and the design process through computer aided design and drafting, orthographic representations and solid models of engineering designs, dimensioning and working drawings according to ANSI Y14.5M. Prerequisite: None. Fall, Spring.

ENTC 2202. 2 sem. hrs. (1:3)
MANUFACTURING PROCESS I
Introduction to metal manufacturing processes; casting, forging, rolling, extrusion, drawing, sheet_metal forming, cutting tools turning and milling operations, abrasive machining, welding and_joining. Prerequisite: MATH 2312. Spring.

ENTC 2204. 2 sem. hrs. (1:3)
MANUFACTURING PROCESS II
Introduction to non-metallic manufacturing process; powder compaction, molding, forming of plastics, rapid prototyping, surface technology, metrology, quality assurance, human factors, safety, automation, CIM. Prerequisite: MATH 2312. Fall.

ENTC 2305. 3 sem. hrs. (2:3)
ENGINEERING DESIGN GRAPHICS II
Use of computer aided design and solid modeling tools in process piping, instrumentation documentation, electronics, electrical power, structural steel, reinforced concrete, and architectural drawings. Prerequisite: ENTC 1304. Spring.

ENTC 2403. 4 sem. hrs. (3:2)
STATICS AND DYNAMICS
Covers force vectors, equilibrium, force systems, structural analysis, friction, centroids and centers of gravity, moments of inertia, kinematics of particles and rigid bodies, impulse and momentum. Prerequisites: PHYS 2425, MATH 2413. Spring.

ENTC 2414. 4 sem. hrs. (3:3)
CIRCUIT ANALYSIS I
Fundamental aspects of DC circuit analysis: charge, voltage, resistance, current, and power; Ohm's Law; methods of analysis; series and parallel circuits; Kirchhoff's voltage and current

laws; Thevenin and Norton Theorems; electrical measurement instruments; and use of analysis software. Prerequisite: MATH 2312. Fall, Spring.

ENTC 3310. 3 sem. hrs. (2:2)
MATERIAL SCIENCE I
Structure and properties of ferrous and nonferrous metallic materials; microstructure, mechanical testing, phase diagrams, heat treatment, testing. Prerequisite: CHEM 1311. Spring.

ENTC 3312. 3 sem. hrs. (2:3)
MATERIAL SCIENCE II
Structure and properties of nonmetallic materials; ceramics, polymers, composites, construction materials, failure analysis, nondestructive evaluation, corrosion and thermal properties of materials. Prerequisite: ENTC 3310. Fall.

ENTC 3316. 3 sem. hrs. (2:2)
STRENGTH OF MATERIALS
Concepts in strength of materials, stress, strain; deformation under load, direct, shear, and combined stresses; stress concentrations, bending stresses and torsional shear stresses, deflection in beams and shafts; columns, and pressure vessels. Prerequisite: ENTC 2403. Fall.

ENTC 3320. 3 sem. hrs. (3:0)
THERMODYNAMICS
Thermodynamic properties of liquids and vapors in non-flow and steady-flow process, ideal gas law, applied to refrigeration, power plants, turbines compressors, and internal combustion engines. Prerequisites: PHYS 2425, MATH 2414. Fall.

ENTC 3323. 3 sem. hrs. (2:3)
MANUFACTURING AUTOMATION
Automation in a manufacturing and assembly setting, material handling systems, remote guided vehicles, automated storage and retrieval systems, computer numerical machine tools, robotics. Prerequisite: ENTC 3415 and COSC 1435. Spring.

ENTC 3332. 3 sem. hrs. (2:3)
DESIGN OF MACHINE ELEMENTS I
Nature of mechanical design, stress and deformation analysis, design for different types of loading, belt and chain drives, and gear design. Prerequisite: ENTC 3316. Spring.

ENTC 3346. 3 sem. hrs. (3:0)
COST ESTIMATING
Introduction to contracting, labor and equipment costs, indirect and general overhead costs, and estimates. Case studies used. Prerequisite: ENTC 2204. Fall.

ENTC 3406. 4 sem. hrs. (3:3)
FLUID MECHANICS AND FLUID POWER

Fluid properties, fluids statics, submerged and floating bodies, general energy equation, flow of fluids in pipes, forces exerted by fluids in motion, fluid power, hydraulic and pneumatic systems, flow past bodies, flow in open channels, compressible flow. Prerequisite: ENTC 2403. Fall.

ENTC 3415. 4 sem. hrs. (3:3)
CIRCUIT ANALYSIS II
AC circuit analysis principles: AC generation, periodic functions, complex numbers, phasors, impedance and admittance, network theorems, power, frequency response, filters, transformers, and balanced three-phase systems; and use of analysis software. Prerequisites: ENTC 2414, ENTC 1203, and MATH 2413. Fall.

ENTC 3416. 4 sem. hrs. (3:3)
DIGITAL FUNDAMENTALS
Introduces the principles of digital logic analysis and design: logic functions; logic gates, number systems and conversions; Boolean algebra; logic simplification, combinational circuits, programmable logic devices, sequential circuits, and use of analysis and simulation software. Prerequisite: ENTC 2414. Spring.

ENTC 3418. 4 sem. hrs. (3:3)
MICROPROCESSORS/MICROCONTROLLERS
Introduction to microprocessor architecture, assembly language programming, and interfacing. Topics include computer organization, addressing modes, instruction set, interrupts, timing, memory, and interfacing. Prerequisites: COSC 1435. Fall.

ENTC 3444. 4 sem. hrs. (3:3)
ELECTRONIC DEVICES AND CIRCUITS I
An introduction to semiconductor theory; solid state devices, including diodes, Bipolar Junction transistors, JFETs, and MOSFETs; principles of operational amplifiers; transducers and sensors. Prerequisites: ENTC 3415 and PHYS 2425. Spring.

ENTC 3445. 4 sem hrs (3:3)
ELECTRONIC DEVICES AND CIRCUITS II
The applications of electronic devices, including linear and non-linear Op-Amp circuits, oscillators, wave-shaping circuits, active filters, rectifiers, voltage regulators, and power supplies; industrial electronics. Prerequisites: ENTC 3444. Fall.

ENTC 3450. 4 sem hrs (3:3)
ELECTRONIC SYSTEM DESIGN
Principles of engineering design of electronic circuits and systems; time and frequency responses; network analysis; systems specifications; evaluation, testing, and verification; use of electronic design automation tools. Prerequisites: ENTC 3445. spring.

ENTC 4197. 1 sem. hr.
COOP/INTERNSHIP

Supervised off campus training in the industrial workplace. Oral and written report required. Prerequisite: Approval of Engineering Technology and Cooperative Education Coordinators prior to enrollment in the course. Offered on demand.

ENTC 4315. 3 sem. hrs. (3:0)
PROJECT JUSTIFICATION AND MANAGEMENT
Project justification using payback, ROI, present value, discounted cash flow. Introduction to project management, planning, scheduling, and control, use of project management software, GANTT charts, PERT charts, critical path. Students prepare proposals, including specifications, timelines, schedule, and budget, for projects to be implemented in ENTC 4350. This course should be taken the semester preceding ENTC 4350. Prerequisite: MGMT 3312. Fall.

ENTC 4320. 3 sem. hrs. (3:0)
HEAT TRANSFER
Fundamental study of convection, conduction and radiation as applied to heat transport, heat exchangers, boilers, other heat transfer equipment. Prerequisite: ENTC 3406. Spring.

ENTC 4322. 3 sem. hrs. (2:3)
PROGRAMMABLE LOGIC CONTROLLERS
Introduction to PLCs and their use in industrial automation. Topics include programming, counters, timers, interrupts, and process control applications. Prerequisites: ENTC 3416, ENTC 3444. Spring.

ENTC 4334. 3 sem. hrs. (2:3)
DESIGN OF MACHINE ELEMENTS II
Design and application of shafts, rolling contact bearings, plain surface bearings, fasteners, springs, clutches, brakes frames, and bolted connections using conventional and computer aided design tools. Prerequisite: ENTC 3332. Fall.

ENTC 4335. 3 sem. hrs. (2:3)
ROTATING EQUIPMENT
Installation, design characteristics, operational performance, and maintenance of motors, turbines, pumps and compressors. Prerequisite: ENTC 3332. Spring.

ENTC 4336. 3 sem. hrs. (3:0)
RELIABILITY OF FIXED EQUIPMENT
Process plant fixed equipment, basic stress analysis of pressure vessel elements, welding technology in repair and fabrication, fitness for service, failure mechanisms, major inspection and vessel codes, material selection, technical and management issues. Prerequisite: ENTC 3316. Fall.

ENTC 4338. 3 sem. hrs. (2:3)
RELIABILITY CENTERED MAINTENANCE

Eliminating losses, preventive maintenance and predictive maintenance, equipment reliability, MTBF, PM intervals, FMEA, fault tree analysis, root cause analysis, CMMS, establishing and measuring the effectiveness of a maintenance program, implementing TPM. Case studies used. Prerequisite: ENTC 3316. Spring.

ENTC 4348. 3 sem. hrs. (3:0)
STRUCTURAL STEEL CONSTRUCTION
Function of structures, analysis of statically indeterminate structures, application of the AISC Code to calculations and selection of structural steel members. Prerequisite: ENTC 3316. Fall.

ENTC 4349. 3 sem. hrs. (3:0)
REINFORCED CONCRETE CONSTRUCTION
Design and construction of reinforced concrete members according to the ACI building code. Prerequisite: ENTC 3316. Spring.

ENTC 4350. 3 sem. hrs. (1:5)
CAPSTONE PROJECTS
This course allows students to employ the knowledge attained in other courses to implement (including building, testing, and documenting) the approved project in ENTC 4315, within budget and on schedule. Course requirements include a written report and oral presentations. To be taken the student's final long semester before graduation. Prerequisite: ENTC 4315. Spring.

ENTC 4420. 4 sem hrs (3:3)
EMBEDDED SYSTEMS
Characteristics of embedded systems, system design, interface devices, memory management, interrupt support, input/output applications, software-hardware co-design, modular programming, multitasking, simulation, and control of external devices. Prerequisites: ENTC 3416 and ENTC 3418. Fall.

ENTC 4446. 4 sem. hrs. (3:3)
CONTROL SYSTEMS I
Introduction to control systems; open and feedback; Laplace transform and frequency response; control valves; electric motors; P, PI, and PID modes of control; analog and digital controllers Process characteristics; analysis of control systems; gain and phase margin; stability. Prerequisites: ENTC 3444, MATH 3315. Spring.

ENTC 4448. 4 sem. hrs. (3:3)
CONTROL SYSTEMS II
Continuation of Control Systems I; Control systems design; controller mode selection; control loop tuning; data acquisition systems; distributed control systems; supervisory control; data transmission; networks; analysis and specification of complete control systems. Prerequisite: ENTC 4446. Fall.

ENTC 4490. 1-4 sem. hrs.

SELECTED TOPICS
Subject material variable. May be repeated for credit when topics are different. Prerequisites: Vary depending upon topic. Offered on demand.

ENTC 4496. 1-4 sem. hrs.
DIRECTED INDEPENDENT STUDY
Requires a formal proposal of study to be completed in advance of registration, approval of supervising faculty and chairperson. Prerequisites: Vary depending upon area of study. Offered on demand.