

# ENGINEERING TECHNOLOGY (ETEC)

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## **ETEC 1010. Engineering Foundations. 1-2 Hours.**

This course focuses on leadership and study skills necessary for succeeding in the many career options available to professionals in industrial technology, business, and engineering education. Variable Credit (1 to 2). Course Equivalents: ETEC 1100, ITEC 1100 .

## **ETEC 1366. Machining Technology I. 3 Hours.**

This course serves as an introduction to the problems, techniques, and processes of modern machining technology. Instruction is given in the use of hand and machine tools, introduction to computer numerical control, product planning and development, metric measurement, safety, and opportunities for employment in the machining industry. Course Equivalents: ITEC 1366, ETDD 1366 .

## **ETEC 1371. Descriptive Geometry. 3 Hours. [TCCN: ENGR 1304]**

This course emphasizes problems of space relations of points, lines, surfaces, intersections, and developed surfaces, and their application to the graphical solution of engineering problems. Course Equivalents: ITEC 1371 .

## **ETEC 2366. Machining Technology II. 3 Hours.**

Students learn Computer Numerical Control (CNC) programming as it applies to fundamental milling and turning operations. Topics may include machine tool axis motions, cutting tool setup, methods of work piece setup, cutting tool path design, cutting tool compensation, and canned cycles. Students use computer-aided manufacturing (CAM) software to create toolpaths and programs for multi-axis CNC milling and turning machines. Equivalent Courses: ETDD 2366

**Prerequisite:** ETDD 1366.

## **ETEC 2382. Manufacturing Processes. 3 Hours. [TCCN: ENGT 2310]**

Students examine a broad range of manufacturing processes with an emphasis on understanding manufacturing procedures and changes of physical properties of material during these processes. Topics may include forming and shaping processes, material removal processes, joining processes, casting and solidification processes, engineering metrology and instrumentation, and other aspects of manufacturing.

## **ETEC 2396. Special Topic. 3 Hours.**

This course of faculty-led study is designed to provide exposure of undergraduate students to new engineering technology topics and concepts in a course setting. This course is designed to be a multi-topic course. The student can take the course under various special topics being offered.

**Prerequisite:** ETEC 1010.

## **ETEC 3300. Technology Innovations. 3 Hours.**

This course provides a study of societal technologies and their effects on the daily lives of consumers. The course presents the pervasive nature of technology innovations and increases the awareness of the promises of uncertainty associated with the use of technology as a human enterprise. Course Equivalents: ITEC 3300

**Prerequisite:** ETEC 1010 and Sophomore standing.

## **ETEC 3340. Solar and Wind Energy Systems. 3 Hours.**

This course will examine grid-connected and stand-alone solar photovoltaic and wind energy systems. System components including batteries, PV modules, charge controllers, maximum power point trackers, vertical and horizontal axis turbines, aerodynamics of wind turbines, wind farms and sighting, and inverters will be discussed. A comprehensive review of power production methods from solar and wind resources will be included, along with site surveying, commercial development, economics, and environmental impacts.

**Prerequisite:** ETEE 1340 and Junior Standing.

## **ETEC 3344. Computer Integrated Manufacturing. 3 Hours.**

Students examine the concept of Computer Integrated Manufacturing and its industrial applications. Topics include smart manufacturing, Computer Aided Process Planning, robotics in manufacturing systems, rapid prototyping, and the cost estimating of different manufacturing processes.

**Prerequisite:** ETEC 2382 and ETDD 2366.

## **ETEC 3360. Related Science, Mathematics, & Technology in Occupations. 3 Hours.**

This is the written portion of an 18-hour segment of proficiency examinations. Consent of department chair. Course Equivalents: ITEC 3360

**Prerequisite:** Sophomore standing.

## **ETEC 3361. Related Science, Mathematics, and Technology in Occupations. 3 Hours.**

This is the written portion of an 18-hour segment of proficiency examinations. Course Equivalents: ITEC 3361

**Prerequisite:** Consent of department chair.

## **ETEC 3362. Manipulative Skills in Occupations. 3 Hours.**

This segment is for the manipulative portion of the proficiency examination. Consent of department chair. Course Equivalents: ITEC 3362

**Prerequisite:** Sophomore standing.

## **ETEC 3363. Manipulative Skills in Occupations. 3 Hours.**

This segment is for the manipulative portion of the proficiency examination. Course Equivalents: ITEC 3363

**Prerequisite:** Consent of department chair.

## **ETEC 3364. Related Subjects in Occupational Personal Qualifications. 3 Hours.**

This is the oral portion of the proficiency examination. Consent of department chair. Course Equivalents: ITEC 3364

**Prerequisite:** Sophomore standing.

**ETEC 3365. Related Subjects in Occupations and Personal Qualifications. 3 Hours.**

This is the oral portion of the proficiency examination. Course Equivalents: ITEC 3365

**Prerequisite:** Consent of department chair.

**ETEC 3367. Engineering Materials Techniques. 3 Hours.**

Students learn about the physical properties, industrial applications, limitations, and selection of engineering materials such as polymers and metals.

Topics include atomic structure, stress and strain, phase diagram, standard material tests, and environmental considerations. Course Equivalents:

ETEC 4367, ITEC 4367

**Prerequisite:** ETEC 1010.

**ETEC 3374. Time And Motion Study. 3 Hours.**

A study of the principles of motion economy, work measurement and improvement of production methods as they apply to modern industry. Attention is given to human relations, work simplification, and selected charting procedures. Course Equivalents: ITEC 3374

**Prerequisite:** Sophomore standing.

**ETEC 3375. Statics. 3 Hours.**

This course examines qualitative and quantitative treatments of forces and moments. Designing trusses, constructing free body diagrams, and performing equilibrium analysis for coplanar systems are included. Course Equivalents: ITEC 3375

**Prerequisite:** PHYS 1301, PHYS 1101, and MATH 1316 or MATH 1420.

**ETEC 3382. Manufacturing Processes II. 3 Hours.**

Students learn manufacturing processes of extrusion, injection molding, and thermoforming applied to polymers and composite materials. Topics include different types of additive manufacturing processes such as fused deposition modeling, vat photopolymerization, binder jetting, sheet lamination, and powder bed fusion.

**Prerequisite:** ETEC 2382 or consent of instructor.

**ETEC 4096. Directed Study. 1-6 Hours.**

Arranged professional and developmental learning experiences incorporating a practical application of engineering technology skills and practices. To include internships, individual research and industry studies. Variable Credit (1-6).

**Prerequisite:** Sophomore standing.

**ETEC 4099. Engineering Innovation. 1-3 Hours.**

In this course, students work closely with faculty to design, develop, and implement innovative engineering projects as part of their capstone experience. Variable credit 1-3. Course Equivalents: ETEC 4199

**Prerequisite:** Faculty Approval.

**ETEC 4199. Senior Design I. 1 Hour.**

In this course, students work closely with faculty to design, develop, and implement innovative engineering projects as part of their capstone experience.

**Prerequisite:** Senior Standing.

**ETEC 4315. Quality Assurance and Control. 3 Hours.**

Students learn principles and practices related to quality assurance and quality control in engineering. They develop quality control charts and analyze product liability and process capability. They solve problems related to reliability, failure modes, and engineering quality systems such as ISO standards, supplier certification requirements, and Six Sigma. Topics include the evolution of quality assurance and control practices in engineering applications, and modern quality tools as related to strategic planning, cost of quality, customer satisfaction, and employee involvement. Statistical methods are used to evaluate process capability, inspection data, continuous improvement efforts, and lean manufacturing techniques. Junior Standing.

**Prerequisite:** STAT 3379 or consent of instructor.

**ETEC 4340. Alternative Energy Technology. 3 Hours.**

This course examines existing and potential ambient alternative energy sources, production capacities, energy harvesting, conversion, and storage techniques. The course will also examine fundamental concepts, terminology, definitions, and nomenclature common to all energy systems. Course Equivalents: ITEC 4340

**Prerequisite:** ETEE 1340.

**ETEC 4350. Utilities Project Management. 3 Hours.**

Students examine key energy and industry utility competencies including project management, bidding and negotiation, technical job execution, and safety management. This class is designed to immerse students into the field of Engineering, Procurement, and Construction (EPC), through real projects from the industry.

**Prerequisite:** Junior standing and consent of instructor.

**ETEC 4355. Agile Technology Framework. 3 Hours.**

Students learn values, principles and practices related to Agile Technology Framework. Students also examine best practices in the evolution of agile process development in engineering, manufacturing and digital transformations. Topics may include project framework, Agile House of Lean model, Agile roadmap, system thinking, Scrum and Kanban, Agile Cycles, story writing, and Agile Tools.

**Prerequisite:** MATH 1314 and Junior Standing.

**ETEC 4366. Building Codes and Regulations. 3 Hours.**

Students learn building inspection principles and construction codes, covering their history, development, and regulatory role. Topics may include the International Residential Code (IRC) for residential requirements and the International Building Code (IBC) for commercial construction.

**Prerequisite:** Junior standing or instructor approval.

**ETEC 4369. Special Topics in Industrial Technology. 3 Hours.**

Individual study in specialized areas of Industrial Technology. To be directed and approved by the Industrial Technology advisor. This course is designed to be a multitopic course. The student can take the course under various special topics being offered. Sophomore standing. Course Equivalents: ITEC 4369

**Prerequisite:** Approval of faculty, program coordinator and chair.

**ETEC 4374. Biomedical Instrumentation I. 3 Hours.**

Students investigate the foundational theory, techniques, and applications of devices used in the field of healthcare. Course content is delivered in didactic and lab settings and may include the application of anatomy and physiology to the understanding of equipment outputs, safety, and limitations. Topics may include biopotentials, electrodes, transducers, and the varied display outputs of the patient-machine interface.

**Prerequisite:** ETEC 1010.

**ETEC 4375. Biomedical Instrumentation II. 3 Hours.**

Students investigate advanced concepts of biomedical instrumentation. Topics include ultrasonics, lasers, and surgical equipment with a focus on equipment performance analysis and troubleshooting.

**Prerequisite:** ETEC 4374.

**ETEC 4376. Strength of Materials. 3 Hours.**

This courses focuses on the analysis of stresses, strains, deflection, and deformation in bodies under the action of loads. Topics include statically indeterminate axially loaded members, thermal deformation, distribution of bending and shearing stresses in beams, stress and shear flow formulas, combined stresses and Mohr's circle, torsion on a circular shaft, empirical column formulas, and bolted joint failures.

**Prerequisite:** ETEC 3375.

**ETEC 4377. Biomedical Imaging. 3 Hours.**

Students apply engineering theory to the operations of common medical imaging modalities. Course content will be delivered in didactic and lab settings. Topics may include the scope and limitations of engineering requirements to produce and display the appropriate content associated with radiography, fluoroscopy, mammography, computed tomography, magnetic resonance imaging, ultrasound, positron emission tomography, and single-photon emission computerized tomography.

**Prerequisite:** ETEC 4374.

**ETEC 4384. Supervisory Personnel Practice. 3 Hours.**

This course introduces students to the principles of management as pertaining to personnel. Responsibilities of management, industrial economics, supervisory information, training, group dynamics, work simplification, labor and human relations, working conditions, morale, motivation, and mental health are covered. Course Equivalents: ITEC 4384

**Prerequisite:** ETEC 1010 or Junior standing.

**ETEC 4390. Directed Studies. 3 Hours.**

Designed to provide students with the opportunity to gain specialized experience in one or more of the following areas: internship, laboratory procedures, individualized study, innovative curricula, workshops, specialized training schools, and seminars. Internship is required of all teacher education majors. May be repeated or taken concurrently to a maximum of 9 hours. Faculty, Program Coordinator and Chair approval required. Course Equivalents: ITEC 4390

**Prerequisite:** Sophomore standing.

**ETEC 4391. Work Base Mentorship. 3 Hours.**

Students work in their specialization in the industry. Students may complete their internship in one or two semesters. Students must work 100 clock hours for 1 college credit. Faculty, Program Coordinator and Chair approval required. Course Equivalents: ITEC 4391

**Prerequisite:** Junior standing.

**ETEC 4392. Sustainable Systems in Construction. 3 Hours.**

Students explore modern sustainable construction techniques and practices from an architectural perspective. Students learn to apply green building standards, energy-efficient design, and renewable materials in construction projects with an overview of Leadership in Energy and Environmental Design (LEED) certification through case studies, hands-on projects, and industry research.

**Prerequisite:** ETEC 3367.

**ETEC 4399. Senior Design II. 3 Hours.**

Students learn advanced topics and gain hands-on skills in engineering technology fields while working in team environments. Topics and activities may include design and implementation processes, application of project management that culminates with analysis, drawings, installation or prototype, and testing of a significant project. Presentation and technical reports are required.

**Prerequisite:** ETEC 4099 or ETEC 4199 and Senior Standing.