ENGINEERING TECHNOLOGY

Shaping the next generation technical workforce through hands-on and real-world experience

With topics including communications theory, digital signal processing, analog systems, and digital systems. The ABET-accredited Electrical Engineering Technology program gives you the practical experience to meet both industry demand and your career goals. Small class sizes mean opportunities to collaborate with faculty who are industry experts, giving you one-on-one attention to excel in the dynamic, highly rewarding field of electronics.

From advanced manufacturing concepts to complex machine design, the ABET-accredited Mechanical Engineering Technology program will ignite your fascination with how things work. You'll work alongside faculty experts to learn mechanical design, fluid/thermal technology, production systems, automation engineering and more.

Through hands-on experience in the classroom and in the field, this applied degree program gives you the practical experience to turn your passion into a career.

Programs

- Electrical Engineering Technology Major (B.S.) (http://catalog.unh.edu/undergraduate/manchester/programs-study/engineering-technology/electrical-engineering-technology-major-bs)
- Mechanical Engineering Technology Major (B.S.) (http://catalog.unh.edu/undergraduate/manchester/programs-study/engineering-technology/mechanical-engineering-technology-major-bs)

Courses

Engineering Technology (ET)

**ET 401 - Introduction to 3D Printing**

*Credits: 4*

This project-based course introduces current methods in the design and fabrication of 3D models. Students will apply and integrate techniques from mathematics, engineering, and computing design 3D models and then manufacture them by the use of 3D printers. Credit cannot be earned by students who have completed UMST 599 SpcTop/Intro to 3D Printing. Special fee.

*Attributes: Environment, TechSociety (Disc)*

**ET #601 - Data Structures and Data Bases**

*Credits: 4*

A brief review of fundamental container classes; stacks, queues and link lists followed by more advanced data structures and concepts using search algorithms, iterators, and efficiency indicators. The second part of the course will include the development and use of relational databases using a commercial database engine. Java console applications and minimal Graphic User Interface applications will be used throughout the course to develop and test concepts.

**ET 625 - Technical Communications**

*Credits: 4*

Designed to improve students’ capabilities to prepare and present technical information in written and oral form and through electronic means. ET majors should take this course early in their program of study so that proficiencies developed can be utilized in later courses. (Also listed as ENGL 502.) Writing intensive.

*Attributes: Writing Intensive Course*

*Equivalent(s):* ENGL 502, ENGL 502H

**ET 630 - Analytical Methods in Engineering Technology**

*Credits: 4*

Review of college-level mathematics including differential and integral calculus with applications and advanced topics, e.g., Fourier analysis, Laplace transform technique, and probability and statistics. Prereq: engineering technology majors only.

*Equivalent(s):* ET 695

**ET 635 - Fluid Technology and Heat Transfer**

*Credits: 4*

Fundamental principles of fluid technology and basic principles of heat transfer, with applications in solving practical problems, and how these concepts are used in the HVAC area. Prereq: Thermodynamics; Mechanical Engineering Tech majors.

**ET #639 - Heating, Ventilation and Air Conditioning I**

*Credits: 4*

First in a two course sequence designed to familiarize the student with the design and operation of fluid thermal systems with specific applications in the heating, ventilating, and air conditioning of occupied spaces and some reference to industrial process control. Prereq: thermodynamics, calculus, or permission. Lab. Special fee.

**ET 640 - Heating, Ventilation and Air Conditioning II**

*Credits: 4*

Second in a two course series designed to acquaint the student with the fundamentals of fluid thermal system design with specific topics in solar loads on buildings, air conditioning system requirements, pump and fan selection, piping and duct system design, and an introduction to controls. Prereq: ET #639 or permission. Lab. Special fee.

**ET 641 - Production Systems**

*Credits: 4*

Market forecasting; waiting line theory; manufacturing inventories and their control; production scheduling; quality control. Prereq: differential and integral calculus.

**ET 644 - Mechanical Engineering Technology Concepts in Analysis and Design**

*Credits: 4*

Kinematics, kinetics, work and energy, fluids, heat transfer; application of these concepts to problems in mechanical design. Prereq: strength of materials and dynamics and ET 637.

**ET #647 - Advanced Perspectives on Programming**

*Credits: 4*

Several programming languages will be selected for study and analysis. Students will gain knowledge regarding the languages studied and conduct analysis related to comparisons and divergence in capabilities. Prereq: intermediate programming skills in three or more programming languages. Major suggested languages of interest are: Java, C++, Visual Basic, Visual C++, Windows, Visual Basic.Net and C# or permission.
ET #655 - Engineering Tech Seminar Series
Credits: 1
Five talks will be given that introduce the ET student to the softer issues of technology. Talks will be given in the areas of Ethics, Diversity, Lifelong Learning, Functioning in technical teams, and the importance of timeliness, scheduling and product improvement. For the most part, talks are given by outside industrial personnel dealing in these specific areas. Students are required to write a short paper on three of the five topic areas. Class discussion of each talk takes place during regular class time. No prerequisites.

ET 671 - Digital Systems
Credits: 4
Digital systems design and application using TTL and CMOS devices, design of systems, and interfacing. Digital design project required. Prereq: introductory digital design. Special fee. Lab.

ET 674 - Control Systems and Components
Credits: 4
Topics include linear systems analysis, the Laplace transform and its properties, controllers, root locus technique, transient response analysis, first- and second-order systems, error analysis, and control system design. Prereq: differential and integral calculus. Lab.

ET 675 - Electrical Technology
Credits: 4

ET 677 - Analog Systems
Credits: 4

ET 680 - Communications and Fields
Credits: 4
Topics include Fourier series analysis; the Fourier transform and its properties; convolution; correlation including PN sequences; modulation theory; encoding and decoding of digital data (NRZ-M, NRZ-S, RZ, Biphasel-L, and Manchester); antennas and antenna pattern; Radar Range Equation; and an introduction to information theory. Prereq: differential and integral calculus. Lab.

ET 695 - Independent Study
Credits: 1-4
Individual reading, writing, or laboratory work carried out under the tutelage of a faculty member. Prereq: approval of the adviser. Repeat Rule: May be repeated for a maximum of 4 credits. Equivalent(s): ET 630, ET 696, ET 697

ET 696 - Topics in Mechanical Engineering
Credits: 4
New or specialized courses not covered in regular course offerings. Prereq: permission. Repeat Rule: May be repeated for a maximum of 4 credits. Equivalent(s): ET 695

ET 697 - Topics in Electrical Engineering Technology
Credits: 4
New or specialized courses not covered in regular course offerings. Prereq: permission. Repeat Rule: May be repeated for a maximum of 4 credits. Equivalent(s): ET 695C

ET 706 - Internship
Credits: 1-4
On-the-job skill development through fieldwork in industry. Normally, supervision is provided by a qualified individual in the organization with consultation by a faculty sponsor. Written report required. Internships may be part or full time, with course credits assigned accordingly. May be repeated to a maximum of 4 credits. Credit/Fail. Repeat Rule: May be repeated for a maximum of 4 credits.

ET 707 - Object Oriented Design and Documentation
Credits: 4
Current design techniques and strategies, including State Transition Diagrams (STD) and United Modeling Language (UML), provide the core of the course. Case studies of large programming projects will be developed. Group programming projects will be completed based upon case studies. Prereq: intermediate programming skills in one or more of the following OOP language: Java, C++, Visual C++ Windows, Visual Basic.Net and C# or by permission.

ET #717 - Network Security
Credits: 4
The technical, operational, and managerial issues of computer systems and network security in an operational environment. Addresses the threats to computer security including schemes for breaking security, and techniques for detecting and preventing security violations. Emphasis on instituting safeguards, examining different types of security systems, and applying the appropriate level of security for the perceived risk. Prereq: Java programming.

ET #727 - CT Software Development Project
Credits: 4
This course requires the development of a real world project that responds to an engineering focused organizational need. The project is undertaken by a team of students. An iterative approach is used to incrementally address the project requirements while constructing a prototype of the software engineering solution to the original problem. Electrical Engineering Tech and EET: Computer Technology majors only.

ET 733 - Business Organization and Law
Credits: 4
Corporations; proprietorships; product liability; contracts; federal agencies; commercial paper; conditions of employment; business ethics; bankruptcy; U.C.C. Special fee. Writing intensive. Attributes: Writing Intensive Course Equivalent(s): ET 633

ET 734 - Economics of Business Activities
Credits: 4
Elementary financial accounting; compound interest and time value of money; sources of capital; cost estimating; depreciation; risk and insurance; personal finance. Prereq: differential and integral calculus. Special fee. Equivalent(s): ET 634
ET 747 - User Interface Design
Credits: 4
This course familiarizes students with Human Computer Interaction and the significant role it plays in product design and development. The principles of HCI, examples of good and bad applications, and factors that determine a design's effectiveness are covered. Stages of the product development life cycle are discussed to understand the progression of a project from conception to delivery and the impact it has on HCI. (Also listed as COMP 640.) Electrical Engineering Technology majors only.

ET 751 - Mechanical Engineering Technology Project
Credits: 4 or 8
Students are required to find solutions to actual technological problems in design, fabrication, and testing as posed by industry. Students define the problem, prepare a budget, and work with the client company to research, design, build, and test the software and/or hardware needed. Prereq: senior standing in E.T. A year-long course: 4 credits per semester; an IA grade (continuous course) given at the end of first semester. Withdrawal from course results in loss of credit.
Repeat Rule: May be repeated for a maximum of 8 credits.
Equivalent(s): ET 651

ET 781 - Introduction to Automation Engineering
Credits: 4
Students are introduced to the topics needed to develop a good understanding of the basic principles of Automation Engineering. This introductory course covers a wide variety of topics such as performance of sensors, actuators, motors and drives, PLC's and HMI, environmental controls, robots, machine vision systems, and controls and system integration. Prereq: ET 674 Control Systems and Components. Open to Electrical Engineering Technology, and Mechanical Engineering Technology majors only.

ET 788 - Introduction to Digital Signal Processing
Credits: 4
This course will deal with the topics of spectral representation of periodic and non-periodic analog signals followed by discrete sampling and aliasing and how it relates to Nyquist sampling theorem. The z-transform will be introduced as the required mathematical tool along with an introduction to MATLAB and its associated DSP tool box. Spectral analysis of digital signal will be accomplished using these tools. Convolution and digital filtering will also be covered. Lab. Prereq: ET 680 Communications and Fields or equivalent.

ET 790 - Microcomputer Technology
Credits: 4
Microcomputer systems design, including assembly language, interfacing, processor timing and loading, and inter-processor communications via local area networks. Hardware, software, and architecture of both Intel 80X86 and Motorola 68XX0 microprocessors. Microcomputer applications with emphasis on lab work using Motorola HCII microcontroller. Prereq: ET 671. Special fee. Lab.
Equivalent(s): ET 690

ET 791 - Electrical Engineering Technology Project
Credits: 4 or 8
Students are required to find solutions to actual technological problems in design, fabrication, and testing, as posed by industry. Students define the problem, prepare a budget, and work with the client company to research, design, build, and test the software and/or hardware needed. Prereq: senior standing in E.T. Special fee. A year-long course: an IA grade (continuous course) given at end of first semester. Withdrawal from course results in loss of credit.
Repeat Rule: May be repeated for a maximum of 8 credits.
Equivalent(s): ET 691

Electrical Engineering Technology Faculty (https://manchester.unh.edu/program/bs/electrical-engineering-technology-major/#collapse_108)
Mechanical Engineering Technology Faculty (https://manchester.unh.edu/program/bs/mechanical-engineering-technology-major/#collapse_105)