# Engineering Technology (ENGT)

Course information contained within the Bulletin is accurate at the time of publication in June 2025 but is subject to change. For the most up-to-date course information, please refer to the Course Catalog.

**ENGT 2202. Programming Fundamentals in Bioengineering. 1.5 Credit Hour.**
This course will introduce Engineering Technology and Mechanical Engineering Technology students to programmatic methods and matrix algebra with specific applications in Bioengineering. Students will learn programming fundamentals such as loops and conditionals, as well as how to apply these methods to data analysis. In addition to the use of built-in Matlab functions, including those used for basic human interface, students will also learn to write their own functions and the methods to assemble complex programs.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in (MATH 1031, MATH 1041, MATH 1941, or MATH 1951)

**ENGT 2322. Applied Strength of Materials. 3 Credit Hours.**
Investigation of the elastic behavior of materials through the study of normal stress, strain, shear, and deformation under centric loading, flexural stress, shear, and deformation under transverse and eccentric loading, torsional stress, combined stress, stress concentration, and the stability of columns.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in (ENGT 2331 or ENGR 2331)

**ENGT 2329. Additive Manufacturing - 3D Printing. 3 Credit Hours.**
This course will introduce students to the engineering side of creating objects built layer by layer. The course is designed to offer a wide overview of the additive manufacturing dynamic field combined with in-depth, hands-on experience in the lab. Students will learn about the various 3D printing technologies, their applications, and their limitations. The lab teamwork will focus on designing products and testing the capabilities of Fused Deposition Modeling (FDM) 3D printers. A final project consisting of designing and processing of a complex object will be presented in class at the end of the semester.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of D- in (MEE 1117, ENGR 1117, or BIOE 2201)

**ENGT 2331. Applied Engineering Statics. 3 Credit Hours.**
Provides an understanding and application of principles of equilibrium of particles and rigid bodies that are subjected to concentrated and distributed forces using vector mechanics. Subjects covered include vector mathematics, force and moment systems in two dimensions, free body diagrams and the static equilibrium of structures, centroids, moments of inertia, frictional systems, shearing force, and bending moment diagrams.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- (except where noted) in (MATH 1031 (may be taken concurrently), MATH 1042 (D- or higher; may be taken concurrently), 'Y' in MATW, or 'Y' in METW) and (PHYS 1021 or PHYS 1061)

**ENGT 2521. Applied Fluid Mechanics. 3 Credit Hours.**
Fluid properties, fluid statics, fluid flow concepts, dynamic similitude, fluid resistance, ideal flow, compressible flow, pneumatic and hydraulic applications.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in (ENGT 2331 or ENGR 2331)

**ENGT 3001. Research Design and Methods in Bioengineering. 2 Credit Hours.**
In this course the upper division students will learn how to integrate fundamental principles of biology, chemistry, engineering, mathematics (including statistics) and physics to develop practical solutions for a variety of biomedical problems from cells to organisms. Students will use both engineering (methodology) and scientific (hypothesis) approaches to problem-solving thereby learning to distinguish between the two approaches. This course will teach the students the fundamental principles underlying modern measurements and control instrumentation utilized in science and engineering. Taking a quantitative and hands-on approach to measurement theory and practice, this course will present and analyze example instruments currently used in academic and industrial research. In addition, the students will consider and discuss bioethical issues involving biological and living systems. Specific bioethics topics that will be covered include stem cells, patents, conflict of interest, patient rights, animal rights, organ donation, and data manipulations but are not limited to them.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in (MATH 1031, MATH 1041, or MATH 1941) and (CHEM 1031 or CHEM 1951)

**ENGT 3182. Independent Study in Engineering Technology. 1 to 5 Credit Hour.**
Students may complete a regular course during semesters in which the course is not offered to meet prerequisite or graduation requirements. An instructor is assigned to supervise the student.

**Repeatability:** This course may be repeated for additional credit.

**ENGT 3201. Applied Materials Technology. 3 Credit Hours.**
Atomic and molecular structures, bonding and interatomic forces, thermodynamics and kinetics of solid state reactions, mechanical and electronic properties.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in (CHEM 1031 or CHEM 1035), (PHYS 1022, PHYS 1062, or PHYS 1962), and (ENGT 2322 (may be taken concurrently) or ENGR 2333 (may be taken concurrently))

**ENGT 3323. Applied Dynamics. 3 Credit Hours.**
A non-vector approach to the kinematics and kinetics of a particle employing the methods of force-mass acceleration, work-energy, and impulse momentum. Kinematics of rigid bodies in general plane motion using methods of force-mass acceleration and work-energy.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- (except where noted) in (ENGT 2331 or ENGR 2331) and (MATH 1031, MATH 1042 (D- or higher), MATH 1942 (D- or higher), 'Y' in MATW, or 'Y' in METW)

**ENGT 3532. Thermodynamics. 3 Credit Hours.**
Properties of a substance, work and heat interaction, first law of thermodynamics, carnot cycle, entropy, ideal gases, irreversibility, and efficiency. NOTE: Special Authorization for Non-Technology Majors. Approved for ENGT, MET, CMT, ENVT.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- (except where noted) in (MATH 1031, MATH 1042 (D- or higher), 'Y' in MATW, or 'Y' in METW) and (PHYS 1022 or PHYS 1062)

**ENGT 3651. Manufacturing Control Systems. 3 Credit Hours.**
A survey course covering pneumatic and hydraulic controls, programmable controllers, digital circuits, electro-mechanical servos and industrial instrumentation, and transducers. Laboratory.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of D- in ECE 2112.

**ENGT 3652. CAD/CAM/CNC. 3 Credit Hours.**
Solids modeling, geometric tolerancing, welds, treads, dimensions, numerical control simulation, and post processing. Basic components of NC systems, coordinate systems, motion control, programming languages, CNC and DNC, laboratory and demonstrations.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of D- in (ENGR 1117 or MEE 1117)

**ENGT 3661. Project Management in Engineering Technology. 2 Credit Hours.**
This is a hands-on experience for Engineering Technology and Mechanical Engineering Technology students to gain practical insights into project management from the perspective of a Project Manager. Students will engage in hands-on learning through a simulated project experience, where they'll navigate every stage of project management. From analyzing a Request for Proposal to crafting a comprehensive contract proposal complete with budgeted costs, schedules, scope of work, and terms. Students will learn techniques for effectively managing technical teams, conducting impactful kick-off meetings, ensuring team accountability, performing critical path analyses, and mitigating issues like scope creep and change management. By the course's end, students will proficiently prepare written contract documents and present their findings in a professional setting.

**Repeatability:** This course may not be repeated for additional credits.

**ENGT 4040. Special Topics. 1 to 5 Credit Hour.**
A course designed to present new and emerging areas of engineering technology. The course may also be used to present areas not normally taught in the college. Course requirements vary with the topic and instructor. Offered as needed or as appropriate.

**Repeatability:** This course may be repeated for additional credit.

**ENGT 4119. Professional Seminar. 1 Credit Hour.**
Preparation for entering the working and professional worlds of engineering and the job market. Includes preparation of résumés, interviewing techniques, securing and holding a job, advancement, professional registration, ethics, and professional societies.

**Repeatability:** This course may not be repeated for additional credits.

**ENGT 4175. Engineering Technology and Mechanical Engineering Technology Capstone Project I. 2 Credit Hours.**
The Capstone Project serves as the culmination of the knowledge and expertise gained through the Engineering Technology and Mechanical Engineering Technology programs. This course is designed to prepare students for the execution phase of the Capstone Project by fostering the development and application of supplementary skills. These include: 1) choosing a project, problem identification, understanding constraints, defining the primary objective, and establishing a manageable scope of work, 2) acquiring additional technical proficiency essential for achieving the project's goals, and 3) refining technical, critical thinking, writing, and teamwork abilities. By the course's conclusion, students will have completed all conceptual design and preparatory tasks, seamlessly transitioning to the implementation phase of the project.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- (except where noted) in ENGT 2521, ENGT 3532, ENGT 4119 (may be taken concurrently), and ENGR 3003 (D- or higher)

**ENGT 4196. Engineering Technology and Mechanical Engineering Technology Capstone Project II. 3 Credit Hours.**
This course is the culmination of a two-semester capstone experience, emphasizing collaborative engineering technology and mechanical engineering technology projects across diverse domains. The course is designed to allow students to complete the execution phase of the Capstone Project. Students will present their work through an oral presentation and in a final report, allowing them to showcase their completed project and synthesis of theoretical knowledge and practical applications.

**Course Attributes:** WI

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in ENGT 4175.

**ENGT 4278. Cardiac Devices. 3 Credit Hours.**
Intended for electrical engineering, biology, and bioengineering students. No course prerequisites. This course will cover cardiac anatomy and physiology, the hearts electrical system in health and disease, cardiac ecg rhythm interpretation, design and function of ecg monitoring devices, pacemakers and external and implanted defibrillators, and arrhythmia detection algorithms. The course will include observation of pacemaker implants, and troubleshooting in a pacemaker follow-up clinic. The course will prepare students to take the Heart Rhythm Society Allied Professional Pacemaker Certification examination. It is intended to put students in a competitive advantage for getting jobs in the expanding pacemaker and other medical electronics device industries.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of C- in (any MATH course numbered 1022 to 4999, 'Y' in MC6, 'Y' in MC6A, 'Y' in MATW, 'Y' in MC6T, or 'Y' in METW) and any PHYS course numbered 1021 to 4999.

**ENGT 4342. Machine Elements. 3 Credit Hours.**
Survey of the design and application fundamentals underlying the sound selection and use of common machine elements such as shafts, bearings, clutches, brakes, gears, chain and belt drives, etc. Term design project.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of D- (except where noted) in (ENGR 1117 or MEE 1117), (ENGT 2322 or ENGR 2333 (C- or higher)), and (ENGT 3323 or ENGR 2332 (C- or higher))

**ENGT 4532. Heating, Ventilating, and Air Conditioning. 3 Credit Hours.**
Establishment of design requirements for environmental comfort conditioning. Heating, heat pumps, humidity control, cooling, ventilation, integrated systems, controls and instrumentation, computer-aided design. Design project.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of D- in (ENGT 2521 and ENGT 3532)

**ENGT 4641. Production Tooling. 3 Credit Hours.**
Fundamentals of the design of work-holders and of tooling for inspection and gauging, welding and joining processes, and punch presses. A weekly practicum covers applications of fundamentals to typical tool design problems.

**Repeatability:** This course may not be repeated for additional credits.

**Pre-requisites:** Minimum grade of D- (except where noted) in ENGR 1117, (ENGR 2333 (C- or higher) or ENGT 2322 (C- or higher)), and ENGT 3652.