

# ENGINEERING TECHNOLOGY (ENGT)

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## **ENGT 101 Introduction to Engineering Technology (3 credits)**

This course introduces students to the history, responsibilities, and career opportunities within the engineering technology field. Emphasis is placed on critical thinking and problem-solving skills. Students study report writing, calculator usage, data collection and analysis, measurement systems, geometry, right triangle trigonometry, and basic computer skills, including word processing and spreadsheet applications. Also examined are the ethical standards that guide engineering practices. This course may require field trip(s). A reasonable alternative to the required field trip(s) will be available.

Prerequisite(s): (MATH 023 or MATH 024 and CIS 102 (may be taken concurrently)) or (MATH 017 and CIS 102 (may be taken concurrently)) or (MATH 018 and CIS 102 (may be taken concurrently)) or (Next Gen QAS with a score of 263 and CIS 102 (may be taken concurrently)) or (SAT Mathematics with a score of 530 and CIS 102 (may be taken concurrently)) or (Accuplacer Elem Algebra with a score of 050 and CIS 102 (may be taken concurrently)) or (Accuplacer College Math with a score of 001 and CIS 102 (may be taken concurrently)) or ( and CIS 102 (may be taken concurrently)) or ( and CIS 102 (may be taken concurrently)) or (PARCC Algebra II with a score of 750)

## **ENGT 102 Blueprint Reading (1 credit)**

This course examines the basic principles of blueprint reading. Topics include line types, orthographic projections, dimensioning methods, and notes. Students learn how to interpret different types of blueprints and schematics used in various engineering, technical or industrial environments. Students interpret the different types of standard symbols and abbreviations found on the drawings and schematics, such as electrical or mechanical drawings and wiring diagrams.

## **ENGT 103 Introduction to 3D Printing (2 credits)**

This course is an introduction into the world of 3D printing, including the equipment and software used in this exciting technology. Students will assemble a 3D printer kit, and learn and use various open source software to model and print objects. The class will be offered in a workshop format with hands-on lab based instruction and activities.

## **ENGT 104 Intermediate 3D Printing (3 credits)**

This course expands the application of 3D Printing techniques learned in ENGT 103. Students use calibration files and other techniques for print optimization and finishing. Basic 3D Scanning and enhancement of scanned files are introduced. Open source modeling software and meshing software are explored. Rapid Prototyping and Additive Manufacturing concepts used in the production process are explained. A capstone project is required.

Prerequisite(s): ENGT 103

## **ENGT 105 Electrical Control Systems (3 credits)**

This course covers the basic concepts needed to understand the operation and programming techniques common to most Programmable Logic Controllers (PLC). An overview of Programmable Logic Controllers and the different number systems are covered. Topics include various number systems, programming fundamentals, timers, counters, sensors and their wiring, input/output modules and wiring, arithmetic instructions, and an overview of plant floor communications. Course fee.

Prerequisite(s): (ENGT 108)

## **ENGT 106 Introduction to Additive Manufacturing (3 credits)**

This course will explore 3D printing and its role in Additive manufacturing, global product development, and innovation. Students will have the opportunity to use 3D printers. Through the use of 3D printers, students will practice the techniques of 3D printing. The objective of this course is for the students to learn the fundamental skills and terminology of 3D printing.

## **ENGT 107 Principles of Hydraulics and Pneumatics (4 credits)**

This course covers the basic concepts needed to understand the operation and design of hydraulic and pneumatic systems. Topics include measurement of pressure flow, measurement systems, pumps, valves, filters, controlling pressure, fluid flow, actuators, seals, reservoirs, hoses, pneumatic controllers, and safety protocols. Course fee.

Prerequisite(s): (ENGT 101) or (ENGT 106)

## **ENGT 108 Introduction to Electronics (4 credits)**

This course provides a broad introduction to electronics. It focuses on DC and AC circuit fundamentals, including electrical components, voltage, current, resistance, Ohm's Law, energy and power, series circuits, parallel circuits, series-parallel circuits, capacitors, inductors, and transformers, RC, RL, RLC circuits and the application of circuit theorems in AC analysis.

Prerequisite(s): Accuplacer College Math with a score of 045 or (Next Gen AAF with a score of 237) or (MATH 026) or (PARCC Algebra II with a score of 750)

## **ENGT 109 LabVIEW Fundamentals (3 credits)**

This course introduces students to the basics of LabVIEW programming language. LabVIEW is an interactive, graphical programming language that enables users to write sophisticated programs and applications required by the engineering technology field. LabVIEW's graphical programming environment has become an industry standard. Successful completion of this course prepares students for the Certified LabVIEW Associate Developer (CLAD) certification. Course fee.

## **ENGT 110 3D Printing in Additive Manufacturing (3 credits)**

This course expands the application of 3D printing techniques learned in ENGT 106. Different printing processes are explored. Failed prints will be analyzed. Basic 3D scanning and enhancement of scanned files are introduced. Open source modeling software and meshing software are explored. Rapid prototyping and additive manufacturing concepts used in the production process are explained. Simple jig and fixtures are modeled and printed. Problem-based case learning is used to examine prototyping issues.

Prerequisite(s): (ENGT 103) or (ENGT 106)

## **ENGT 115 Optimizing Print Files (3 credits)**

This course will explore various techniques and software applications used to modify or optimize 3D print files. Students will learn fundamental techniques of changing print files using open source software commonly used in 3D printing. Students will examine and modify G-code software for FFF 3D printers. Students will evaluate their modifications by printing the file in 3D.

Prerequisite(s): ENGT 110

**ENGT 150 Machining I (3 credits)**

This course provides an introduction to a variety of material-working processes that are common to the machining industry. Topics include safety, process-specific machining equipment, measurement devices, set-up and layout instruments, and common shop practices.

Prerequisite(s): or Next Gen QAS with a score of 263

**ENGT 152 Machining II (3 credits)**

This course builds on Machining I to reinforce and add to important concepts as well as provide additional practical experience with specific machining equipment. Machine work included in this course, not in Machining I, includes using computerized numerical control machines and electric discharge machines. Course fee.

Prerequisite(s): ENGT 150 or or

**ENGT 160 Welding I (3 credits)**

This course is an introduction to arc welding machines and accessories, oxyacetylene cutting equipment, and types of uses of electrodes. Students will learn flat, vertical, horizontal and overhead welds, types of joint design, (butt, lap and T-joints), basic welding symbols, and safety practices.

**ENGT 162 Welding II (3 credits)**

Welding II builds on the skills learned from Welding I by continuing horizontal, vertical, and overhead welding positions and adding electric arc and gas welding. This course will also provide the student with techniques and manipulative skills required for gas metal arc welding (MIG) and gas tungsten arc welding (TIG).

Prerequisite(s): or ENGT 160

**ENGT 182 Technical Drawing (2 credits)**

This course will develop the student's ability to read, interpret, create sketches, and use technical drawings found in a variety of industries. Topics include line types, orthographic projections, dimensioning methods, notes, and free hand sketching. The student will learn how to visualize objects depicted in technical drawings (multi-views). This course will provide the student the opportunity to apply this knowledge and learn the skills needed to create free hand sketches.

**ENGT 193 Independent Study: Reverse Engr (3 credits)**

This course will develop the student's ability to create Block Diagrams, Wire Diagrams and Bill of Material project application. Student Learning Objectives Linked to Relevant Academic Outcomes Upon satisfactory completion of this course, the student will be able to: Develop Block Diagrams (Program Goal 3: Demonstrate competency in using technical tools, technology, methods and processes. Create Wire Diagrams (Program Goal 3) Identify Bill of Material (Program Goal 3)

**ENGT 201 Materials in Manufacturing (3 credits)**

ENGT 201: Materials in Manufacturing (3 credits) This course is an introduction to a broad spectrum of engineering materials used in various industries. Emphasis is on the types, properties, production, and application of the materials. The topics include selection of materials, availability, elastic moduli, yield strength and ductility, hardness, fracture, toughness, fatigue, corrosion, deformation, and a CADD design project to incorporate various engineering materials. Course Fee

**ENGT 223 Principles of Mechanics (3 credits)**

This course is designed for students in the Engineering Technology Program. The course focuses on establishing a hands-on background in the basic principles of mechanics as applied to an industrial setting. A broad range of tools and techniques are presented which introduce students to industry standard procedures and equipment. Topics include hand tools, fasteners, basic fundamentals of mechanics, lubrication, bearings, seals, gaskets and packing, belt drives, chain drives, gears, couplings, clutches and brakes, and rigging.

Prerequisite(s): (ENGT 101 and MATH 103)

**ENGT 224 Quality Assurance for Technicians (2 credits)**

Quality Assurance for Technicians teaches basic quality assurance components as they apply to a manufacturing environment. This course introduces the basic engineering principles and technical skills in support of engineers and other professionals engaged in maintaining consistent manufacturing standards. Students are introduced to quality tools, basic statistics and control charts, blueprint reading, geometric dimensioning and tolerancing, measurements, problem solving, and system auditing. Course fee.

Prerequisite(s): (ENGT 101 and ENGT 223 and MATH 103)

**ENGT 225 Quality Control & Metrology for Additive Manufacturing (3 credits)**

This course is designed to explain the challenges encountered when measuring additive manufactured parts. Methods and technologies for measuring, evaluating and validating additive manufactured parts are explored to convey best measurement practices.

Prerequisite(s): (ENGT 115)

**ENGT 230 Additive Manufacturing Capstone (3 credits)**

Using the PBCL (Problem Based Case Learning) framework, students will make a direct connection to a real-world (the case) workplace situation, applying the knowledge, skills, and attitudes acquired throughout the additive manufacturing concentration. Students, under the guidance of industry mentors and HCC faculty, address problems encountered in industry and work to an effective solution throughout the semester. Working within teams and effective communication skill will also be developed. Pre-requisites: ENGT 106, ENGT 110, and ENGT 115, Co-requisite ENGT 225

Prerequisite(s): or (ENGT 106 and ENGT 110 and ENGT 115 and ENGT 225 (may be taken concurrently))

**ENGT 272 Cooperative Education II: Engineering Technology (2 credits)**

Cooperative Education experiences are work-based learning experiences with an employer for a specific period of time. The experience may be paid and must be related to the career and specific curriculum in which the student is enrolled. It is an opportunity for the student to supplement/integrate classroom learning with learning from a related work setting. Students registers for one to four credits of Cooperative Education in the curriculum in which they are enrolled. Students must have completed 12 credits prior to co-op, and have a GPA of 2.0 or higher. Please see the program coordinator and the Coordinator for Career Services in Advising, Career & Transfer Services for approval.

**ENGT 273 Cooperative Education III: Engineering Technology (3 credits)**

Cooperative Education experiences are work-based learning experiences with an employer for a specific period of time. The experience may be paid and must be related to the career and specific curriculum in which the student is enrolled. It is an opportunity for the student to supplement/integrate classroom learning with learning from a related work setting. A student registers for one to four credits of Cooperative Education in the curriculum in which he/she is enrolled. Students must have completed 12 credits prior to co-op, and have a GPA of 2.0 or higher. Please see the Coordinator for Career Services in Advising, Career & Transfer Services for approval.

**ENGT 274 Cooperative Education: Engineering Technology IV (4 credits)**

Cooperative Education experiences are work-based learning experiences with an employer for a specific period of time. The experiences may be paid and must be related to the career and specific curriculum in which the student is enrolled. It is an opportunity for the student to supplement/integrate classroom learning with learning from a related work setting. Students registers for one to four credits of Cooperative Education in the curriculum in which they are enrolled. Students must have completed 12 credits prior to co-op, and have a GPA of 2.0 or higher. Please see the program coordinator and the Coordinator for Career Services in Advising, Career & Transfer Services for approval.