

# ENGINEERING

*Program Purpose: Engineering Program prepares students for transferring to degree completion programs or for earning an Associate of Science Degree by providing high quality education, rigorous UC and CSU transferable engineering courses, with the student-first approach, in order to help students succeed in their educational and career goals. It also prepares students for the work place by providing them with the skills necessary for internships or entry level engineering positions. Students who complete engineering courses will understand the application of engineering principles to the design and manufacturing of products and critically evaluate observations and measurements through the use of accepted engineering methods. They will also be able to apply physical laws, engineering concepts and formulas to analyze engineering problems and synthesize solutions qualitatively and quantitatively. Completers will also communicate engineering design ideas and solutions to problems through engineering drawings, oral presentations, and technical writing.*

The field of engineering is a particularly broad one that offers several areas in which to specialize. The lower division course work described below provides basic preparation for any of these choices.

## Transfer Information

Students planning to transfer need to consult with a counselor, prepare a Student Education Plan, and take advantage of the support services available in the Career Transfer Center located in Fountain Hall, (805) 378-1536.

## Engineering Courses

### ENGR M01 Introduction to Engineering 2 Units

*In-Class Hours:* 17.5 lecture, 52.5 laboratory

*C-ID:* ENGR 110

Explores the branches of engineering, the engineering profession, the interface of the engineer with society, and engineering ethics. Explains the engineering education process and explores effective strategies for students to reach their full academic potential. Introduces the methods of engineering analysis, engineering design and problem solving. Develops written, computer and oral communication skills in analyzing and presenting data in engineering design and problem solving.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

### ENGR M04 Engineering Design/CAD 3 Units

*In-Class Hours:* 35 lecture, 52.5 laboratory

*Prerequisites:* MATH M06 or MATH M07

Develops engineering drawing skills through manual and computer-aided drafting (CAD) in two- and three-dimensions. Improves three-dimensional spatial visualization skills. Utilizes principles of orthographic drawing, pictorial drawing, and descriptive geometry. Covers principles of orthographic projections; graphical presentation of normal, inclined, and oblique surfaces; auxiliary and sectional views; dimensioning; and tolerances. Builds an understanding for the engineering problem solving and design process through design projects.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Credit Limitations:** UC (ENGR M04, DRFT M02A, and DRFT M02B combined: maximum credit, one course).

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

### ENGR M05 2-Dimensional Computer-Aided Drawing and Design with AutoCAD 3 Units

*In-Class Hours:* 52.5 lecture

*Prerequisites:* ENGR M04

*Corequisites:* MATH M05

Develops further engineering drawing skills through computer-aided design (CAD) software in two dimensions using AutoCAD. Includes instruction in 2D vector-based drawings for architectural design, industrial design, and various civil, electrical, and mechanical engineering projects. Covers technological approaches and best practices in representing engineering design concepts in response to a problem need. Continues to develop a deeper understanding and a more sophisticated working knowledge of AutoCAD's many features and capabilities in preparation for industry certification, namely the AutoCAD Certified User (ACU) certification.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGR M07 SolidWorks I-Engr Mech Design 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* ENGR M04

Matures further engineering drawing skills through computer-aided design (CAD) software in three dimensions using SolidWorks. Enhances three-dimensional (3D) spatial visualization and refinement of 3D modeling representations. Covers principles in mechanical design, design methodology, design for manufacturing, and cultivates topics in engineering materials selection and metal forming/removal theory through various case studies and examples. Advances further the understanding of the engineering design process and problem solving through design projects.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGR M08 SolidWorks II-Engr Design Practicum 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* ENGR M07

Develops further the various application and analysis tools available in SolidWorks for a more comprehensive three-dimensional modeling of engineering designs. Explores various features for model configuration and modification, including using linked variables and equations. Advances further the understanding of the engineering design process and problem solving through design projects.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGR M10 Programming and Problem-Solving in MATLAB 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* MATH M25A or MATH M25AH*C-ID:* ENGR 220

Utilizes the MATLAB environment to provide students with a working knowledge of computer-based problem solving methods relevant to science and engineering. Introduces the fundamentals of procedural and object-oriented programming, numerical analysis, and data structures. Uses examples and assignments in the course which are drawn from practical applications in engineering, physics, and mathematics.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGR M12 Engineering Materials 3 Units***In-Class Hours:* 52.5 lecture*Prerequisites:* CHEM M01A OR CHEM M01AH AND PHYS M20A

Examines the interrelationships between processing, structure, properties, and performance of various engineering materials such as metals, polymers, ceramics, composites, and semiconductors. Investigates the effects of heat, stress, imperfections, and chemical environments upon material properties and performance. Emphasizes developing an ability to select appropriate materials to meet engineering design criteria. Requires a design project on material properties, selection, and application.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGR M12L Engineering Materials Lab 1 Unit***In-Class Hours:* 52.5 laboratory*Prerequisites:* ENGR M12 or concurrent enrollment*C-ID:* ENGR 140L, ENGR 140B (with ENGR M12L)

Provides opportunities to directly observe and study the interrelationships between engineering materials' structure and properties. Teaches the operation of engineering materials testing equipment, data gathering and analysis, and technical writing mechanics through formal laboratory reports.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGR M16 Engineering Statics and Strength of Materials 4 Units***In-Class Hours:* 70 lecture*Prerequisites:* PHYS M20A and PHYS M20AL and MATH M25B or concurrent enrollment in MATH M25B

Examines the relationships which exist between two important branches of mechanics, namely, statics and strength of materials. Applies the principles of statics to the study of forces both external and internal to the body, moments and couples, responsible for maintaining a state of equilibrium. Uses the principles of strength to investigate the effects of external and internal loadings on the stability and deformation of the body. Analyzes two- and three-dimensional force systems including frictional forces, support reactions, and distributed forces with respect to rigid bodies, trusses, frames, machines, beams, shafts, and thin-walled pressure vessels. Incorporates concepts of centroids, area moments of inertia, stresses, strains, Mohr's Circle, shear and bending moment diagrams, ductile and brittle failure theories, and deformations associated with axial, torsional and flexural loadings. Surveys analysis of statically indeterminate axially loaded members.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M18 Engineering Dynamics 3 Units***In-Class Hours:* 52.5 lecture*Prerequisites:* ENGR M16

Studies fundamentals of kinematics and kinetics in describing the motion of particles and rigid bodies, and introduces the concepts of free and forced mechanical vibrations. Investigates kinematics principles for analyzing rectilinear and curvilinear motion of particles and plane motion of rigid bodies. Uses kinetics principles, including Newton's laws of motion, work-energy and impulse-momentum principles, to examine causes of motion and to predict the type of motion caused by the application of forces. Studies mechanical vibrations of particles and rigid bodies in terms of simple harmonic motion.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M20 Electrical Engineering Fundamentals 3 Units***In-Class Hours:* 52.5 lecture*Prerequisites:* PHYS M20B and MATH M35 or concurrent enrollment*C-ID:* ENGR 260

Introduces analysis of electrical circuits using analytical techniques based on the application of circuit laws and network theorems. Studies direct current (DC) and alternating current (AC) circuits containing resistors, capacitors, inductors, dependent sources, operational amplifiers, and switches. Investigates natural and forced responses of first and second order resistor-inductor-capacitor (RLC) circuits, use of phasors, AC power generation including power transfer and power factor correction calculations, and energy concepts.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M20L Electrical Engineering Fundamentals Lab 1 Unit***In-Class Hours:* 52.5 laboratory*Prerequisites:* PHYS M20BL and ENGR M20 or concurrent enrollment*C-ID:* ENGR 260L

Examines the operation of basic electrical and electronic circuits. Provides practical knowledge for designing, constructing, and troubleshooting of electrical circuits and basic operational amplifier circuits using real circuit components and circuit simulation software. Teaches the basic use of electrical testing and measuring instruments, including multimeters, oscilloscopes, function generators, and power supplies, while considering tolerance value and non-ideal aspects of laboratory instruments. Emphasizes the interpretation of measured and simulated data based on principles of circuit analysis for direct current, transient, and sinusoidal steady-state or alternating current conditions.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None

**ENGR M33 Intro to Environmental Engr 3 Units***In-Class Hours:* 52.5 lecture

Introduces local and global environmental pollution issues. Focuses on air, water, and soil pollution by identifying the various sources of contamination, examining the processes responsible for contaminant transformation and transportation, investigating the various methods of contaminant removal, and considering the effects of these contaminants on the health of humans and the ecosystems. Discusses and analyzes the relevant physical, chemical and biological principles responsible for all the aforementioned processes. Identifies and explains the applicable federal, state and local regulatory practices.

*Advisories/Rec Prep:* CHEM M12 and MATH M03 or MATH M03B**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M33L Environmental Engineering Lab 1 Unit***In-Class Hours:* 52.5 laboratory*Prerequisites:* ENGR M33 or Concurrent Enrollment

Provides students with working knowledge of physical, chemical, and biological processes that control environmental pollution transport, transformation, and remediation. Explores various laboratory techniques in analytical chemistry and microbial biology related to identification and quantification of inorganic and organic contaminants present in soil, water, wastewater, and air samples.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M35 Solid Waste and Hazardous Waste Management 3 Units***In-Class Hours:* 52.5 lecture*Prerequisites:* ENGR M33

Provides students with a working knowledge of solid waste and hazardous waste management practices including waste generation, minimization, transport, treatment, recycling, storage, and disposal. Identifies and explains the applicable federal, state, and local regulatory policies. Assesses the consequences of these regulations, and the various waste management practices, on the public health and safety as well as environmental sustainability. Surveys waste management techniques pertaining to plastic wastes, biomedical wastes, and electronic wastes. Draws examples and assignments from practical applications in the field of environmental engineering. This course is part of a Certificate in Environmental Engineering Technology.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M80 Internship in Engineering 1-4 Units***In-Class Hours:* 75-300 paid cooperative*Prerequisites:* Completion of or concurrent enrollment in one course in the discipline and instructor approval

Provides on-the-job learning to develop effective work habits, attitudes, and career awareness in paid or unpaid internships that are related to the discipline. Involves the development and documentation of learning objectives and the completion of an internship paper, presentation, or project. Includes both workplace supervisor and faculty adviser feedback and/or written evaluations. Course Credit Limitation: To take this course, contact the Career Transfer Center. Requires orientation session. Students receive one unit of credit for each 60 hours unpaid or 75 hours paid work. May enroll in up to 4 units a semester with a maximum of 16 total units of any type of work experience.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Repeatable for Credit:** Course may be taken up to 3 times for credit.**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGR M122 Independent Study - Engineering 0.5-3 Units***Formerly:* ENGR M22A*In-Class Hours:* 26.25-157.5 laboratory*Prerequisites:* Completion of one course in Engineering and instructor approval

Allows independent study for students who wish to extend their knowledge of a particular area of Engineering through research and study. Utilizes an approved independent project. Includes one-on-one work with the instructor. Interested students should contact an Engineering instructor for assistance in developing a contract for learning about a specific topic.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None

## Engineering NONCREDIT Courses

**ENGR M912 Bridge to ENGR M12 - Engineering Materials 0 Units**

Prepares students for the prerequisite materials necessary to be successful in ENGR M12. Includes chemistry concepts such as chemical bonds and thermodynamics, physics concepts such as force vectors, and some mathematical concepts such as trigonometric principles, differentiation, integration, vector dot product, and graphing.

**Grade Modes:** Pass/No Pass Grading, Student Option- Letter/Credit**Repeatable for Credit:** Unlimited.**Degree Applicability:** Noncredit course; not applicable for degree credit**AA/AS GE:** None**Transfer Credit:** None

**ENGR M916 Bridge to ENGR M16 - Engineering Statics and Strength of Materials 0 Units**

Prepares students for the prerequisite materials necessary to be successful in Engineering Statics and Strength of Materials course - ENGR M16. Includes physics and mathematics concepts such as treating forces as vectors, drawing free-body diagrams, applying Newton's laws of motion to static equilibrium, trigonometric principles, differentiation, integration, Cartesian vectors, vector addition and subtraction, vector magnitude and direction, vector dot product and cross product.

**Grade Modes:** Pass/No Pass Grading, Student Option- Letter/Credit

**Repeatable for Credit:** Unlimited.

**Degree Applicability:** Noncredit course; not applicable for degree credit

**AA/AS GE:** None

**Transfer Credit:** None

## Engineering Technology Courses

**ENGT M02 Digital Circuits 3 Units**

*In-Class Hours:* 35 lecture, 52.5 laboratory

Studies the construction and application of logic circuits as they relate to modern electronic computers and digital systems by applying Boolean algebra, mathematics, and number systems. Analyzes basic gate and digital circuits and their integration (MSI - medium scale integration and LSI - large scale integration) into complete systems. Describes and incorporates circuit simplifications, mapping, digital counters, registers, encoders/decoders, converters and timing.

*Advisories/Rec Prep:* Knowledge of Elementary Algebra the equivalent of MATH M01 is recommended

**Grade Modes:** Letter Graded, Credit by exam, license etc.

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGT M04 Basic Electronics 3 Units**

*In-Class Hours:* 35 lecture, 52.5 laboratory

Introduces the basics of electrical theory and devices including Ohm's Law, magnetism, electromagnetism, voltage, resistance, current, inductance, capacitance, reactance, impedance, phase angle, power-factor, current control devices, sensors and actuators, transformers, motors, power distribution systems, and proper usage of electrical test equipment. Uses concepts of electrical power (Watts, Volt-Amps, Volts-Amps reactive units), energy, and Kirchoff's Laws, along with basic math to solve fundamental electrical problems related to both alternating current (AC) and direct current (DC) circuits. Addresses basic electrical safety procedures.

*Advisories/Rec Prep:* Ability to solve simple algebraic linear equations in one variable

**Grade Modes:** Letter Graded, Credit by exam, license etc.

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGT M06 Introduction to Microprocessors and Microcontrollers 3 Units**

*In-Class Hours:* 35 lecture, 52.5 laboratory

*Prerequisites:* ENGT M02

Introduces the basics of microprocessor and microcontroller functions and architecture including internal operations, input/output (I/O) ports, tri-state buses, memory, instruction sets, interrupts, addressing modes, and address decoding. Uses machine language and assembly language programming and logical and mathematical operations for assembly, Peripheral Interface Adapter (PIA) interfacing as well as troubleshooting techniques. Includes the design of hardware, software, and interfacing circuitry to provide microprocessor- or microcontroller-based functions or systems.

**Grade Modes:** Letter Graded, Credit by exam, license etc.

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGT M10 Introduction to Unmanned Aerial Vehicle Technology 3 Units**

*In-Class Hours:* 35 lecture, 52.5 laboratory

*Prerequisites:* MATH M06 or MATH M07

Introduces topics related to Unmanned Aerial Vehicle (UAV) systems, regulations, and operating principles including aerodynamics, propulsion, flight mechanics, materials, design, mission planning, and various operating environments. Includes historical background, career opportunities, and professionalism in operating UAVs. Presents a wide range of UAV technology and its various uses in industry. Studies current and former Federal Aviation Administration (FAA) regulations regarding UAV systems and operations. Develops basic operating skills for quad-rotor configured unmanned aircrafts. This course prepares students for Part 107 Drone (UAS - Unmanned Aerial Systems) licensing.

**Grade Modes:** Letter Graded, Credit by exam, license etc., Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**ENGT M12 Radar Fundamentals 3 Units**

*In-Class Hours:* 35 lecture, 52.5 laboratory

*Prerequisites:* MATH M06 or MATH M07

Introduces the basics of radar technology, emphasizing the fundamentals of modern civilian and defense radar systems. Examines the principles governing the operations and applications of radars used in air traffic controls, ships and boats, defense industry, automotive industry, testing instrumentation, and sensors.

**Grade Modes:** Letter Graded, Credit by exam, license etc., Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None



**ENGT M122 Independent Study - Engineering Technology 0.5-3 Units***In-Class Hours:* 26.25-157.5 laboratory*Prerequisites:* Completion of at least one course in Engineering Technology and instructor approval

Allows independent study for students who wish to extend their knowledge of a particular area of Engineering Technology through research, study, and design projects. Utilizes an approved independent project. Includes one-on-one work with the instructor. Interested students should contact an Engineering Technology instructor for assistance in developing a contract for learning about a specific engineering technology project.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGT M20 Electronic Devices 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* ENGT M04

Introduces electronic devices as components of electrical circuits responsible for regulating current flow for information processing and system control. Examines the purpose, construction, and circuit application of diodes, light-emitting diodes (LEDs), transistors, thyristors, integrated circuits (ICs), and optoelectronics. Explains the operation and the uses of potentiometers, switches, fuses, relays, and transformers. Applies basic electronic theory to analytical problem solving, experimentation, and circuit design relevant to the usage of the various electronic devices.

**Grade Modes:** Letter Graded, Credit by exam, license etc., Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGT M28 Capstone Project in Electronics Engineering Technology 2 Units***In-Class Hours:* 105 laboratory*Prerequisites:* ENGT M02, ENGT M04, ENGT M06, and ENGT M20

Provides engineering design experience by requiring the integration of knowledge gained in previous coursework related to electronics engineering technology. Incorporates the engineering design process, problem solving and troubleshooting, teamwork, project management, technical writing, and project presentation skills.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGT M30 Programmable Logic Controllers 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* ENGT M02

Examines fundamentals of Programmable Logic Controllers (PLCs), with an emphasis on introductory programming of PLCs. Focuses on problem analysis with solutions that integrate programming formats, auxiliary commands and functions, common programming languages, and popular software programs used with PLCs. Includes instructions on PLC architecture, installation, maintenance, troubleshooting, and repairs.

**Grade Modes:** Letter Graded, Credit by exam, license etc., Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGT M32 Electrical and Mechanical Devices 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* ENGT M02, ENGT M04, ENGT M06

Introduces the design and the architecture of electromechanical systems including robotics through the use of the engineering design process. Examines fundamentals and functions of various electrical and electronic components, mechanical components, and micro-computers, and their incorporation into a functioning electromechanical system. Develops skills to troubleshoot a malfunctioning electromechanical component or system.

**Grade Modes:** Letter Graded, Credit by exam, license etc., Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**ENGT M38 Capstone Project in Mechatronics Engineering Technology 2 Units***In-Class Hours:* 105 laboratory*Prerequisites:* ENGT M02; ENGT M04; ENGT M06; ENGT M30; ENGT M32

Provides engineering design experience by integrating the knowledge gained in previous coursework related to mechatronics engineering technology. Incorporates the engineering design process, problem solving and troubleshooting, teamwork, project management, technical writing, and project presentation skills.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None

- Engineering, Associate in Science (<http://catalog.vcccd.edu/moorpark/programs-courses/engineering/engineering-as/>)
- Engineering Computer Aided Design and Drafting: SOLIDWORKS, Certificate of Achievement (<http://catalog.vcccd.edu/moorpark/>)

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- Engineering, Certificate of Achievement (<http://catalog.vcccd.edu/moorpark/programs-courses/engineering/engineering-coa/>)
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## Dean

Robert Cabral, Phone (805) 378-1572

## Faculty

Scarlet Relle

## Counselors

Daniel Aguilar, Chuck Brinkman, Trevor Hess, Samantha Zaldivar