

# ENGINEERING

Engineers are significant and valuable members of our society that are relied upon to generally produce solutions through the utilization, design, and development of a plethora of technologies. With the increasingly high demand for qualified engineers in the workforce, this program allows those in the local community the opportunity to fill a vital role.

Upon completion of the Associate in Science in Engineering, students will have obtained the skills and preparation necessary to transfer into an Engineering program at a four-year university, and ultimately seek employment as an engineer. Some graduates may also pursue entry-level positions in the engineering field. Students completing the program will be knowledgeable in aspects of engineering utilized in the many different fields of engineering along with a strong foundation in mathematics and physics; structural analysis, circuitry, CAD, programming, material composition, and general systems and applications of engineering in the modern world. Through group projects and laboratory assignments, students will also develop collaboration skills as well as practical hands on skills widely used in the fields of engineering such as, but not limited to; the use of oscilloscopes, electrical motor design and production, circuit building, structural design, strength testing, and generally analyzing the pertinent physical properties of a given system.

## ENGR R101 Introduction to Engineering 2 Units

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

*C-ID:* ENGR 110

This course explores the branches of engineering, the engineering profession, the interface of the engineer with society, and engineering ethics, and the engineering education process while exploring effective strategies to help students to reach their full academic potential. The course introduces the methods of engineering analysis, engineering design and problem solving. Students will analyze and present data in engineering design, and develop written, computer, oral communication, and problem solving skills.

**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

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

## ENGR R130 Engineering Statics 3 Units

*In-Class Hours:* 52.5 lecture

*Prerequisites:* PHYS R131 and MATH R121

*C-ID:* ENGR 130

Engineering Statics applies the principles of mechanics to rigid bodies in two and three dimensional equilibrium systems. Analytical and graphical solutions using force vectors and equivalent force systems to solve problems pertaining to friction, centroids, center of gravity, and moments of inertia for areas is the focus of this course.

**Grade Modes:** Letter Graded

**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 R135 Dynamics 3 Units

*In-Class Hours:* 52.5 lecture

*Prerequisites:* ENGR R130

*C-ID:* ENGR 230

This course addresses the kinematics and dynamics of particles and rigid bodies in two and three dimensions. Topics considered include universal gravitation, conservation laws, work-energy and impulse-momentum relations, and mechanical vibration.

**Grade Modes:** Letter Graded

**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 R140 Materials Science and Engineering 3 Units

*In-Class Hours:* 52.5 lecture

*Prerequisites:* PHYS R131 and CHEM R120

*C-ID:* ENGR 140

An introduction to atomic bonding, crystalline structure and microstructure, and how these structures determine the physical, mechanical, electrical and thermal properties of materials. The course covers metals, ceramics, polymers, composites and semiconductors. Topics include material imperfections, diffusion, mechanical properties, phase diagrams, material selection, processing, heat treatment and strengthening mechanisms. Corrosion phenomena, electrical properties and thermal properties are also covered.

**Grade Modes:** Letter Graded

**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 R140L Materials Science and Engineering Laboratory 1 Unit

*In-Class Hours:* 52.5 laboratory

*Prerequisites:* ENGR R140 or concurrent enrollment and PHYS R131 and CHEM R120

*C-ID:* ENGR 140 L, ENGR 140 B

This course is the laboratory portion of Materials Science and Engineering. It consists of experimental investigations of crystalline structures, the mechanical behavior of metals and polymers, cold-working, heat-treatment, material hardness, ductile-to-brittle fracture behavior, fatigue, equilibrium phase diagrams, steel microstructure and corrosion. Computers are used to control test equipment, gather and process data, and to visualize microscopic images.

**Grade Modes:** Letter Graded

**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 R148 Programming and Problem-Solving in MATLAB 3 Units***Same-As:* MATH R148*In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* MATH R120*C-ID:* ENGR 220

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

**Grade Modes:** Letter Graded**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 R150 Engineering Graphics and Design 3 Units***In-Class Hours:* 35 lecture, 52.5 laboratory*Prerequisites:* MATH R116 or placement as determined by the college's multiple measures assessment process*C-ID:* ENGR 150

This course focuses on the principles of engineering graphics which are necessary to communicate engineering designs. The use of computer-aided drafting CAD in 2 and 3 dimensions as well as drawings produced by hand are skills of great necessity in engineering fields and will be used throughout the course. Using the principles of orthographic drawing, pictorial drawing, and descriptive geometry, students will learn how to visualize, understand, and produce coherent graphics and designs. Central topics include; orthographic projections, graphical presentation of various surfaces, auxiliary and sectional views, dimensioning, and tolerances.

**Grade Modes:** Letter Graded, Credit by exam, license etc.**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 R160 Electronic Circuits and Devices 3 Units***In-Class Hours:* 52.5 lecture*Prerequisites:* PHYS R132 and MATH R143 or concurrent enrollment*C-ID:* ENGR 260

This course provides an introduction to the analysis of electrical circuits. The use of analytical techniques based on the application of circuit laws and network theorems is the main focus of the course. The analysis of DC and AC circuits containing resistors, capacitors, inductors, dependent sources, operational amplifiers, and/or switches shall be employed. Natural and forced responses of first and second order RLC circuits, the use of phasors, AC power calculations, power transfer, and energy concepts are other general topics that are covered in this course.

**Grade Modes:** Letter Graded**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 R160L Electronic Circuits and Devices Laboratory 1 Unit***In-Class Hours:* 52.5 laboratory*Prerequisites:* ENGR R160 or concurrent enrollment*C-ID:* ENGR 260 L

This course serves as an introduction to the construction, measurement, and design of elementary electrical circuits and basic operational amplifier circuits. Students gain familiarity with the basic use of electrical test and measurement instruments, including multimeters, oscilloscopes, power supplies, and function generators. Using principles of circuit analysis for DC, transient, and sinusoidal steady-state (AC) conditions, students develop data interpretation skills by using circuit simulation software and by direct measurements of circuits. Practical considerations such as component value tolerance and non-ideal aspects of laboratory instruments are also introduced.

**Grade Modes:** Letter Graded**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None

- Engineering, Associate in Science (<http://catalog.vcccd.edu/oxnard/programs-courses/engineering/engineering-as/>)

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