Engineering Minor Description

Non-majors in Engineering may elect to minor in this field. Minor requirements may be satisfied by completing 21 approved units, of which 12 must be upper division. Students who have not completed the lower division requirements in calculus, including differential equations, physics, chemistry, and a few engineering courses will find it difficult to complete this minor in the four-year program due to the prerequisite requirements of upper division engineering courses. Added some info.

Students wishing to minor in Engineering must have their minor program approved by the Associate Dean of the College of Engineering and Computer Science.

Degree Program

Minor in Engineering (http://catalog.csus.edu/colleges/engineering-computer-science/engineering/minor-in-engineering)

Contact Information

Kevan Shafizadeh, Associate Dean
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(916) 278-6852
Email the Associate Dean of ECS (assocdean@ecs.csus.edu)
College of Engineering & Computer Science Website (http://www.ecs.csus.edu)

ENGR 1. Introduction to Engineering. 1 Unit
Prerequisite(s): Engineering major status or instructor permission
General Education Area/Graduation Requirement: Understanding Personal Development (E)
Term Typically Offered: Fall, Spring

Engineering study skills, fundamentals of the engineering design process and problem solving, current engineering challenges. Distinctions and similarities of different engineering disciplines. The engineering profession, ethics, teamwork, communication skills. Course helps students make an informed choice of their engineering majors.
Credit/No Credit

ENGR 1A. Fundamentals of Engineering. 3 Units
Prerequisite(s): Algebra and trigonometry or instructor permission.
Term Typically Offered: Fall, Spring

Problem solving skills needed in all areas of engineering offered at Sacramento State. Exposure to the different areas of engineering, and understanding of the relationship between them. Students will work in teams and complete hands-on engineering laboratory experiments and projects. Development of effective communication skills by presenting periodic oral and written reports. Computers will be used throughout. Lecture two hours, laboratory three hours.
Note: Not for degree credit.
Credit/No Credit

ENGR 2. Robotics Explorations. 3 Units
Prerequisite(s): Algebra and Trigonometry.
Term Typically Offered: Fall, Spring

Introduction to robotics. History of robotics, recent advances in the field, common devices such as sensors and actuators. Use of modular robotic kits. Students will be assigned competition based projects.

ENGR 6. Engineering Graphics and CADD (Computer Aided Drafting and Design). 3 Units
General Education Area/Graduation Requirement: Understanding Personal Development (E)
Term Typically Offered: Fall, Spring, Summer

In-depth graphical analysis and solution of typical three-dimensional space problems by applying the principles of orthogonal projection. Fundamentals of interactive computer aided design and drafting. Preparation of engineering drawings utilizing the CAD system. Lecture two hours; laboratory three hours.

ENGR 6W. Engineering Graphics and CADD Workshop. 1 Unit
Corequisite(s): ENGR 6.
Term Typically Offered: Fall, Spring, Summer

Problem solving and discussion of topics in Engineering Graphics and CADD (Computer Aided Drafting and Design) to enhance students' understanding of subject matter. Not for degree credit. Technical activity and laboratory, two hours.
Credit/No Credit

ENGR 7. 3-D CAD Solid Modeling. 3 Units
Prerequisite(s): ENGR 4 or ENGR 6.
Term Typically Offered: Fall, Spring

Applications of three-dimensional representation techniques as used in a typical CAD (computer aided drafting) software package (AutoCAD). Fundamentals employed in creating, modifying, analyzing and filing engineering drawings. This course will have a mechanical emphasis. Lecture two hours; laboratory three hours.

ENGR 17. Introductory Circuit Analysis. 3 Units
Prerequisite(s): PHYS 11C, MATH 45; either the math or physics may be taken concurrently, but not both.
Term Typically Offered: Fall, Spring, Summer

Writing of mesh and node equations. DC and transient circuit analysis by linear differential equation techniques. Application of laws and theorems of Kirchoff, Ohm, Thevenin, Norton and maximum power transfer. Sinusoidal analysis using phasors, average power.

ENGR 17W. Circuits Workshop. 1 Unit
Corequisite(s): ENGR 17.
Term Typically Offered: Fall, Spring, Summer

Elaborates on fundamentals and enhances students' understanding of circuits.
Note: Not for degree credit.
Credit/No Credit
ENGR 30. Analytic Mechanics: Statics. 3 Units
Prerequisite(s): PHYS 11A and MATH 31
Term Typically Offered: Fall, Spring, Summer

ENGR 45. Engineering Materials. 3 Units
Prerequisite(s): CHEM 1E and MATH 30. CHEM 1E may be taken concurrently.
Term Typically Offered: Fall, Spring, Summer
Basic principles of mechanical, electrical and chemical behavior of metals, polymers and ceramics in engineering applications; topics include bonding, crystalline structure and imperfections, phase diagrams, corrosion, and electrical properties. Laboratory experiments demonstrate actual behavior of materials; topics include metallography, mechanical properties of metals and heat treatment. Lecture two hours; laboratory three hours.

Note: Fee course.

ENGR 45W. Engineering Materials Workshop. 1 Unit
Term Typically Offered: Fall, Spring, Summer
Problem solving and discussion of topics in materials science to enhance students' understanding of subject matter. Activity two hours.

Note: Can not be used for the degree requirement.

ENGR 50. Computational Methods and Applications. 3 Units
Prerequisite(s): Math 30 and PHYS 11A; Physics 11A may be taken concurrently
Term Typically Offered: Fall, Spring
Computational methods for solving problems in analysis and design. Introduces lower division students to the use of computer technology for the computations required to solve real world problems in science and engineering. Includes introduction to numerical techniques, introduction to structured programming, and graphic visualization. Practical applications of analysis and design using tools such as MATLAB and C++. Emphasis is on developing confidence and skill in finding computational solutions to practical science and engineering problems. Portable computer recommended. Lecture three hours.

ENGR 60. MEP Orientation and Problem Solving. 2 Units
Term Typically Offered: Fall, Spring
Mandatory class for MEP freshman students on orientation to the University, its resources, facilities and faculty. Students will be encouraged to form a group atmosphere where they can freely interact with each other and value each other as resources. Students will be provided with instruction and materials on study skills, note taking, time management, preparing for tests and dealing with stress. Presentation by working engineers and field trips to engineering firms will be taken. Personal and professional development will also be part of the freshman orientations with leadership, public speaking and career planning being topics of discussion. Lecture one hour; activity two hours.

Note: Not for use as an engineering major technical elective and is not applicable to the baccalaureate degree.

Field trip(s) may be required.

ENGR 70. Engineering Mechanics. 3 Units
Prerequisite(s): PHYS 11A.
Term Typically Offered: Fall, Spring

ENGR 96A. Interdisciplinary Topics in Engineering. 1 Unit
Term Typically Offered: Fall, Spring
Course will enable students to make an informed choice of their engineering majors, engage on interdisciplinary discussions between engineering fields, and equip them with relevant study skills. An introduction to engineering and the fundamentals of problem solving. Distinctions between different disciplines within engineering as well as other similarities. The engineering profession and ethics. Study skills for an engineering education.

Credit/No Credit

ENGR 105. Sustainable Design and Construction. 3 Units
Prerequisite(s): Upper division standing or instructor permission.
General Education Area/Graduation Requirement: GE AREA D
Term Typically Offered: Fall, Spring
Strategies, analysis methods, and processes of environmentally conscious planning, design, construction, operation, deconstruction, and assessment of engineered facilities. Presents a systematic framework for problem solving, decision making, design, and construction using the principles of sustainability as guiding objectives. Tools, and techniques for gathering information, generating, analyzing, and evaluation alternatives, and developing implementation strategies are presented and demonstrated.

ENGR 110. Analytic Mechanics - Dynamics. 3 Units
Prerequisite(s): Student must pass ENGR 30, MATH 45, and MATH 32 or MATH 35 or MATH 100 with a minimum grade of C- or better.
Term Typically Offered: Fall, Spring, Summer
Fundamental principles of kinematics and kinetics, study of motion and force analysis of particles and rigid bodies, application to idealized structures and physical systems, introduction to free and forced vibrations.
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<th>Course Title</th>
<th>Units</th>
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<td>ENGR 110.</td>
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<td>ENGR 112</td>
<td>Mechanics Of Materials</td>
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<td>ENGR 30; ENGR 45; MATH 45; and either CE 4 or ENGR 6</td>
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<td>ENGR 115</td>
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<td>CHEM 1E, PHYS 11A, and MATH 32 or MATH 35 or MATH 100</td>
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<td>ENGR 124W</td>
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<td>ENGR 132</td>
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<td>ENGR 140</td>
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<td>ENGR 150</td>
<td>Technical Communication</td>
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<td>Recommendation based on the results of the WPG or instructor permission</td>
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<td>ENGR 181</td>
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<td>CHEM 1A, PHYS 11A, MATH 45.</td>
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<td>ENGR 194</td>
<td>Career Development Seminar</td>
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<td>ENGR 196B</td>
<td>Energy and Modern Life</td>
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ENGR 201. Engineering Analysis I. 3 Units
Prerequisite(s): MATH 45.
Term Typically Offered: Fall, Spring

Mathematical methods for the solution of advanced engineering problems. Vector analysis, tensors and matrix algebra, complex variable techniques. The applications of these methods to practical engineering problems are demonstrated.

ENGR 202. Engineering Analysis II. 3 Units
Prerequisite(s): MATH 45.
Term Typically Offered: Fall, Spring

Mathematical methods for the solution of advanced engineering problems. Solutions of ordinary and partial differential equations, Fourier series and Laplace transforms and operational calculus. The applications of these methods to practical engineering problems are demonstrated.

ENGR 203. Engineering Statistics. 3 Units
Prerequisite(s): ENGR 115 or equivalent.
Term Typically Offered: Fall, Spring

Applications of statistics to engineering problems. Collection and analysis of data, sampling methods, design of experiments, probability theory, decision theory, analysis of variance, regression analysis, and mathematical curve fitting.

ENGR 296. Experimental Methods for Fluids. 3 Units
Prerequisite(s): ENGR 132, and either MATH 32 or ENGR 202
Term Typically Offered: Spring only

Experimental methods for flow and transport phenomena are studied in the lecture and applied in the lab/field. Topics include planar laser induced fluorescence, acoustic velocimetry, and sediment transport.

ENGR 296A. Quality Management Systems for Engineers. 3 Units
Prerequisite(s): Graduate Standing
Term Typically Offered: Fall, Spring

Designed to equip students with understanding of basic terms and definitions related to quality, a brief history and basic quality concepts, understanding measurement systems and tools, understanding differences of quality control (QC), quality assurance (QA) and quality management (QM), getting familiar with the applications of different tools, systems and standards and how to select proper tools for different quality requirements. Understanding basic inspection, auditing, assessment and evaluation techniques.