ENGINEERING – ENGIN

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Possible career opportunities

The engineering transfer program prepares students to enter four-year engineering schools as juniors. Upon completion of the B.S., students can become electrical, civil, mechanical, chemical, materials, aerospace or industrial engineers.

Associate in science degree Civil engineering

Students completing the program will be able to...

A. apply the skills and knowledge acquired to analyze issues, solve problems, and critically evaluate a proposal or a process.

B. use appropriate quantitative tools to answer scientific questions, represent data, and document scientific findings.

C. demonstrate effective communication with fellow team members, the public, and members of the scientific community, using written, oral, and visual communication methods.

D. safely and appropriately use standard laboratory or field equipment to make precise and reliable measurements.

E. analyze the internal forces and moments in statically determinate structures.

The associate in science degree in civil engineering (ASCE) is offered to prepare students to transfer to a four-year institution in the civil engineering major.

The graduates of this program will be able to apply the basic principles of civil engineering to a variety of technical projects related to the design, construction, managing and sustaining of a wide range of developments such as structural systems, buildings, highways, waterways, lifelines, and infrastructures.

The DVC ASCE degree is intended for transfer. Degree requirements at four-year programs differ from institution to institution, so students wishing to transfer to a particular four-year program must consult with a counselor regarding specific major requirements of a particular university program. Additionally, students are advised that other courses in math, physics and chemistry may be required and that engineering courses have science and math prerequisites. It is recommended that the students contact the counseling office for advisement regarding appropriate sequencing. Finally, the ASCE is a high-unit major; students are advised to meet with a counselor to determine appropriate general education courses to complete their degree requirements.

To earn an ASCE degree students must complete each course used to meet a major requirement with a "C" grade or higher and complete general education requirements as listed in the catalog. Major requirements may be taken only on a "for grade" basis. Certain courses may satisfy both major and general education requirements; however the units are only counted once.

major requirements:		*units*
CHEM-120*	General College Chemistry I	5
ENGIN-110	Introduction to Engineering	3
ENGIN-120	Engineering Drawing	3
ENGIN-230*	Introduction to Circuits and Devices	4
ENGIN-240*	Properties of Engineering Materials	4
ENGIN-255*	Statics	3
MATH-192*	Analytic Geometry and Calculus I	5
MATH-193*	Analytic Geometry and Calculus II	5
MATH-292*	Analytic Geometry and Calculus III	5
MATH-294*	Differential Equations	5
PHYS-130*	Physics for Engineers and Scientists A: Mechanics and Wave Motion	4
PHYS-230*	Physics for Engineers and Scientists B: Heat and Electro-magnetism	4

plus at least 3 units from:

ENGIN-135	Programming for Scientists and Engineers	4
ENGIN-136*	Computer Programming for Engineers Using MATLAB	4
ENGIN-140*	Plane Surveying	4
ENGIN-257*	Statics and Strength of Materials	3
	total minimum units for the major	**53**

**These courses have prerequisites. See a counselor for program sequence.*

Associate in science degree Electrical engineering and computer engineering

Students completing the program will be able to...

A. apply analysis tools and computer tools in problem solving.

B. identify interdisciplinary aspects of engineering projects.

C. apply software engineering principles and procedures.

D. do computer algorithm development using C and C++ techniques.

E. understand the operation and control of electrical measuring equipment.

F. use computer programming skills to develop software for automation, decision making and control of equipment.

G. develop test software for evaluation of digital circuits.

H. analyze the operation of small scale digital and analog circuits.

I. design simple operational amplifier circuits.

J. demonstrate knowledge of magnetism and its applications in the design of transformers and actuators.

K. assemble and test digital and analog circuits from circuit diagrams.

The associate degree program in electrical engineering and computer engineering (EECE) prepares the students for a career in the EECE field or to transfer to a four-year degree program. Graduates entering the workforce will be able to perform the tasks typically expected of an assistant engineer. Students who intend to transfer are advised to select general education Option 2 (IGETC) or Option 3 (CSU GE). General education option 1 (DVC general education) is appropriate for students who do not intend to transfer.

Most core requirement courses have math and science prerequisites. Students must see a counselor for planning appropriate coursework sequence.

To earn an associate degree in electrical engineering and computer engineering, students must complete the core requirements with a "C" grade or higher. Students must also complete general education requirements as listed in the catalog. Certain courses may satisfy both major and general education requirement; however the units are only counted once.

major requirements:		*units*
CHEM-120*	General College Chemistry I	5
COMSC-165*	Advanced Programming with C and C++	4
COMSC-210*	Program Design and Data Structures	4
ENGIN-110	Introduction to Engineering	3
ENGIN-230*	Introduction to Circuits and Devices	4
MATH-192*	Analytic Geometry and Calculus I	5
MATH-193*	Analytic Geometry and Calculus II	5
MATH-292*	Analytic Geometry and Calculus III	5
MATH-294*	Differential Equations	5
PHYS-130*	Physics for Engineers and Scientists A: Mechanics and Wave Motion	4
PHYS-230*	Physics for Engineers and Scientists B: Heat and Electro-Magnetism	4
PHYS-231*	Physics for Engineers and Scientists C: Optics and Modern Physics	4

plus at least 3 units from:		
ENGIN-120	Engineering Drawing	3
ENGIN-121	Engineering Drawing/Descriptive Geometry	3
ENGIN-135	Programming for Scientists and Engineers	4
ENGIN-136*	Computer Programming for Engineers Using MATLAB	4
ENGTC-126	Computer Aided Design and Drafting - Auto CAD	3
MATH-194*	Linear Algebra	3
MATH-195*	Discrete Mathematics	4
	total minimum units for the major	**55**

**Certain courses required for this degree have prerequisite coursework that could add additional units.*

Associate in science degree Mechanical engineering

Students completing the program will be able to...

A. apply the skills and knowledge acquired to analyze issues, solve problems, and critically evaluate a proposal or a process.

B. use appropriate quantitative tools to answer scientific questions, represent data, and document scientific findings.

C. demonstrate effective communication with fellow team members, the public, and members of the scientific community, using written, oral, and visual communication methods.

D. safely and appropriately use standard laboratory or field equipment to make precise and reliable measurements.

The associate in science degree in mechanical engineering (ASME) is designed to prepare mechanical engineering students for transfer to a four-year institution. This program enables graduates to apply basic engineering principles and technical skills in support of engineers engaged in the design and development phases of a wide variety of projects involving mechanical systems.

The DVC ASME degree is intended for transfer. Degree requirements at four-year programs differ from institution to institution, so students wishing to transfer to a particular four-year program must consult with a counselor regarding specific major requirements of a particular university program. Additionally, students are advised that other courses in math, physics and chemistry may be required and that engineering courses have science and math prerequisites. It is recommended that the students contact the counseling office for advisement regarding appropriate sequencing. Finally, the ASME is a high-unit major; students are advised to meet with a counselor to determine appropriate general education courses to complete their degree requirements.

To earn an ASME degree students must complete each required course for the major with a "C" grade or higher and complete all the requirements as listed in the catalog. Major requirements may be taken only on a "for grade" basis. Certain courses may satisfy both major and general education requirements; however the units are only counted once.

major requirements:		*units*
CHEM-120*	General College Chemistry I	5
ENGIN-110	Introduction to Engineering	3
ENGIN-120	Engineering Drawing	3
ENGIN-230*	Introduction to Circuits and Devices	4
ENGIN-240*	Properties of Engineering Materials	4
ENGIN-255*	Statics	3
MATH-192*	Analytic Geometry and Calculus I	5
MATH-193*	Analytic Geometry and Calculus II	5
MATH-292*	Analytic Geometry and Calculus III	5
MATH-294*	Differential Equations	5
PHYS-130*	Physics for Engineers and Scientists A: Mechanics and Wave Motion	4
PHYS-230*	Physics for Engineers and Scientists B: Heat and Electro-magnetism	4

plus at least 3 units from:		
ENGIN-135	Programming for Scientists and Engineers	4
ENGIN-136*	Computer Programming for Engineers Using MATLAB	4
ENGIN-257*	Statics and Strength of Materials	3
	total minimum units for the major	**53**

**These courses have prerequisites. See counselor for program sequence.*

ENGIN-110 Introduction to Engineering

3 units SC

- *36 hours lecture/72 hours laboratory per term*
- *Advisory: College-level reading and writing are expected.*
- *Note: Credit by examination option available.*

This course is an introduction to different engineering disciplines and careers, the role of an engineer in society, engineering ethics, the engineering approach to problem-solving, engineering design process and project development, engineering analysis, concurrent engineering, and application of computers in engineering including design and presentation tools. The emphasis is on hands-on creative problem-solving, teamwork, and effective communication. Students will develop design, analysis, and computer skills through work on projects drawn from various engineering majors. C-ID ENGR 110, CSU, UC

ENGIN-120 Engineering Drawing

3 units SC

- *36 hours lecture/72 hours laboratory per term*
- *Advisory: MATH-114 and ENGIN-119 or equivalents*

This course presents modern drafting using board techniques as well as computer aided design (CAD) principles. Orthographic, oblique, and perspective projection of objects and visualization of the object from projected views are emphasized. Other topics include relationships of points, lines, and planes as well as auxiliary views, dimensioning, tolerancing, threads and fasteners. During the CAD part of the course, students use solid modeling techniques and methods to produce working drawings from CAD solids. CSU, UC

ENGIN-121 Engineering Drawing/Descriptive Geometry

3 units LR

- *36 hours lecture/72 hours laboratory per term*
- *Advisory: ENGIN-120 or equivalent and MATH-121 or equivalent (may be taken concurrently)*

This course covers space relationships of points, lines, and surfaces. Double auxiliaries, curved and warped surfaces, intersections, developments and vector analysisare presented in relation to solving problems. Three-dimensional (3D) computer aided drafting (CAD) systems and solid modeling for civil engineering and mechanical engineering problems are also introduced. CSU, UC

ENGIN-130 Energy, Society, and the Environment

3 units SC

- *IGETC: 4; CSU GE: D; DVC GE: IV*
- *54 hours lecture per term*
- *Advisory: College-level reading and writing are expected. MATH-085 or MATH-085SP or beginning algebra or equivalent*

This course presents an introduction to the sources, uses, economics, and environmental impacts of energy in contemporary society. The role of non-renewable and renewable energy systems and technologies in creating and maintaining sustainable energy systems is emphasized. CSU, UC

ENGIN-131 Technology and Society

3 units SC

- *IGETC: 4; CSU GE: D; DVC GE: IV*
- *54 hours lecture per term*
- *Advisory: College-level reading and writing are expected.*

This course explores the interrelationships between technology and the social sciences. Specifically, the course investigates the societal factors that impact technology (historical, political, economic, ethical and environmental), and the ways in which technology affects society (language, art, music, psychology and sociology). This course is appropriate for students in both technical and non-technical majors. CSU, UC

ENGIN-135 Programming for Scientists and Engineers

4 units LR

- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: MATH-192 (may be taken concurrently) or equivalent*
- *Advisory: College-level reading and writing are expected.*

This course presents an introduction to programming in C/C++ for engineers and scientists. Topics include flowcharts, algorithm design principles, algebraic operations, decision making, loops, records, data structures, file input output operations and linked lists. Students will apply programming principles of numerical methods in science and engineering. C-ID ENGR 120, CSU, UC

ENGIN-136 Computer Programming for Engineers Using MATLAB

4 units LR

- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: MATH-192 or equivalent*
- *Advisory: MATH-193 (may be taken concurrently) or equivalent*

The methods of problem solving and data visualization in engineering and science using the MATLAB programming language will be introduced. Topics include numerical integration and differentiation, solution of systems of equations, regression, roots of equations and solution of differential equations. Programming with functions, local and global variables, file input and output, data formatting, induction, iteration, recursion, and elements of object oriented programming will also be covered. C-ID ENGR 220, CSU, UC

ENGIN-140 Plane Surveying

4 units SC

- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: MATH-121 or equivalent*
- *Note: Same as CONST-116*

This course covers the principles and practices of surveying including measurement of distances, directions, elevations and measuring standards. An introduction to electronic measurements and calibration as well as systematic and random-error analysis is presented. Students will use surveying instruments, perform Global Positioning System (GPS) measurements, and gain experience with map reading and mapping. CSU, UC

ENGIN-150 Topics in Engineering

.3-4 units SC

- *Variable hours*

A supplemental course in engineering designed to provide a study of the current concepts and problems in engineering. Specific topics will be announced in the schedule of classes. CSU

ENGIN-210 Thermodynamics

3 units LR

- *54 hours lecture/18 hours laboratory per term*
- *Prerequisite: CHEM-120 and PHYS-230 or equivalents*

This course introduces the fundamentals of energy storage, thermophysical properties of liquids and gases, and the basic principles of thermodynamics. The course focuses on application of the concepts to various areas of engineering related to energy conversion and air conditioning. The use of computing tools that facilitate problem solving, design analysis, and parametric studies in thermodynamics will be integrated throughout the course. CSU, UC

ENGIN-230 Introduction to Circuits and Devices

4 units LR

- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: MATH-193 or equivalent and PHYS-230 or equivalent*
- *Advisory: College-level reading and writing are expected.*

The course covers the subjects of electrical quantities, Ohm's law, Kirchoff's network theorems, AC and DC circuit analysis, transient and steady state response of circuits, digital circuits, solid state devices, magnetism and magnetic circuits. C-ID ENGR 260 L, CSU, UC

ENGIN-240 Properties of Engineering Materials

4 units LR

- *54 hours lecture/72 hours laboratory per term*
- *Prerequisite: CHEM-120 and PHYS-130 or equivalents*

This course is a study of properties of engineering materials as related to their atomic, microscopic, and macroscopic structures. The application of the basic principles of physics and chemistry to the engineering properties of materials will be covered. Special emphasis will be devoted to the relation between microstructure and the mechanical properties of metals, concrete, polymers, and ceramics, and the electrical properties of semiconducting materials. C-ID ENGR 140B, CSU, UC

ENGIN-255 Statics

3 units LR

- *54 hours lecture per term*
- *Prerequisite: PHYS-130 or equivalent and MATH-193 or equivalent*
- *Advisory: ENGIN-135 or ENGIN-136 or equivalents*

This course covers equilibrium of rigid bodies, structures, beams, flexible cables and fluids under concentrated and distributed forces. The application of the method of sections and free- body diagrams to solve truss problems as well as shear diagrams and bending diagrams and their application to forces in beams, are covered. Wedges, screws, bearings, brakes and other problems involving friction are examined. Virtual work and potential energy methods in the determination of equilibrium conditions in machines and structures are discussed. C-ID ENGR 130, CSU, UC

ENGIN-257 Statics and Strength of Materials

3 units LR

- *54 hours lecture/18 hours lab per term*
- *Prerequisite: PHYS-130 and MATH-193 or equivalents*
- *Advisory: MATH-194 or equivalent*

This course is a study of mechanics and strength of materials, including equilibrium of particles and rigid bodies, analysis of truss and frame structures, concepts of stress and strain, linear elastic materials, axially-loaded structural elements, torsion in circular and hollow shafts, and shear and moment diagrams in beams. Deflection of beams, buckling of columns and energy methods are also discussed. CSU, UC

ENGIN-298 Independent Study

.5-3 units SC

- *Variable hours*
- *Note: Submission of acceptable educational contract to department and Instruction Office is required.*

This course is designed for advanced students who wish to conduct additional research, a special project, or learning activities in a specific discipline/subject area and is not intended to replace an existing course. The student and instructor develop a written contract that includes objectives to be achieved, activities and procedures to accomplish the study project, and the means by which the supervising instructor may assess accomplishment. CSU

ENGIN-299 Student Instructional Assistant

.5-3 units SC

- *Variable hours*
- *Note: Applications must be approved through the Instruction Office. Students must be supervised by a DVC instructor.*

Students work as instructional assistants, lab assistants and research assistants in this department. The instructional assistants function as group discussion leaders, meet and assist students with problems and projects, or help instructors by setting up laboratory or demonstration apparatus. Students may not assist in course sections in which they are currently enrolled. CSU