Program Description

The Engineering Program offers three distinct pathways that include: Mechanical/Aerospace Engineering, Electrical Engineering, and Computer Engineering. Through these pathways, students will complete lower division engineering coursework needed to transfer to any CSU, UC, as well as many other in-state or out-of-state universities, to complete a Bachelor's degree in an Engineering discipline. Moreover, Antelope Valley College has an Engineering Transfer Agreement Pathway (ETAP) with the California State University, Long Beach Antelope Valley Engineering Program; this agreement offers priority acceptance for students satisfying the ETAP .

Staff

Please dial (661) 722-6300, then the 4 digit extension.

Division:	
Christos Valiotis, Dean	x.6415
Suzanne Olson, Administrative Assistant	x.6415
Vacant, Clerical Assistant III	x.6415
Dr. Alexandra Schroer, Department Chair	x.6922
STEM	
Christos Valiotis, STEM Director	x.6415
Jamie Jones, STEM Coordinator	x.6992
Denilson Freitas, STEM Lab Technician	x.6157
Faculty:	
Dr. Jonathan Compton	x.6809
Adjunct Faculty:	V.M.
Jose Alvarado	2160
Karl Major	2137
Jonathan Over	2135

Career Options

Mechanical Engineering	Biomedical Engineering
Electrical Engineering	Aerospace Engineering
Computer Engineering	Civil Engineering

For more sub engineering areas, please see a counselor for details
(Careers may require education beyond the two-year college level.)

Program Learning Outcomes

Computer Engineering

1. Apply knowledge of math, science, and engineering to identify, define, and solve computer engineering related problems.
2. Design and perform tests/experiments, analyze and interpret data, and prepare technical reports as a member of a group.
3. Effectively employ techniques, skills, and computational tools necessary for computer engineering.

Electrical Engineering

1. Apply knowledge of math, science, and engineering to identify, define, and solve electrical engineering related problems.
2. Design and perform tests/experiments, analyze and interpret data, and prepare technical reports as a member of a group.
3. Effectively employ techniques, skills, and computational tools necessary for electrical engineering.

Mechanical Engineering

1. Apply knowledge of math, science, and engineering to identify, define, and solve engineering problems.
2. Communicate effectively and work efficiently in a team environment.
3. Design and perform tests/experiments, analyze and interpret data, and prepare technical reports.
4. Effectively employ techniques, skills, and computational tools necessary for engineering.

Associate Degrees

Computer Engineering

The Associate in Sciences in Computer Engineering will provide students with a fundamental knowledge of Computer Engineering, to enhance their computational and problem solving skills, sharpen their critical thinking, and to ensure proper preparation for junior level Computer Engineering coursework at a university. Students completing this degree should realize that there are many sub disciplines in Computer Engineering and most require a similar core education, but not all. The requirements for an associate degree in Computer Engineering may be satisfied by completing the courses listed below in addition to the associate degree requirements. (See Graduation/Associate Degree Requirements.)

Required Courses (40 units):	**units**
MATH 150, Calculus and Analytic Gemetry	5
MATH 160, Calculus and Analytic Geometry	4
MATH 220, Linear Algebra	4
MATH 230, Introduction to Ordinary Differential Equations	4
MATH 250, Calculus and Analytic Geometry	4
PHYS 110, General Physics	4
PHYS 120, General Physics	4
ENGR 110, Engineering Orientation and Basic Skills,	3
CIS 121, Computer Mathematics	4
ENGR 230, Circuit Analysis	4
	Total 40

Program Electives (20 units):	**units:**
Students will need to complete three of the following courses based on their selected transfer institution's requirements.	
CIS 111, Introduction to Programming and Algorithms	3
CIS 113, Data Structures	3
CIS 123, Assembly Language and Computer Architecture	3
CIS 161, Introduction to C Programming	3
CIS 173, Introduction to C++ Programming	3
CIS 175, Java Programming	3
CIS 177 Introduction to Python Programming	4

Except in cases of a prerequisite requirement, it is not required to take courses in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Pathway	
Fall, First Semester	**units**
ENGR 110, Engineering Orientation and Basic Skills	3
MATH 150, Calculus and Analytic Geometry (GE Area D2)	5
Program Elective (recommended CIS 111) (GE Area E)	3
GE requirement Area D1 (ENGL 101)	3
GE requirement Area C (recommended ART 103)	3
	Total 17
Spring, Second Semester	
MATH 160, Calculus and Analytic Geometry	4
PHYS 110, General Physics (GE Area A)	4
Program Elective	3
GE requirement Area B (recommended POLS 101)	3
	Total 14
Fall, Third Semester	
MATH 250, Calculus and Analytic Geometry	4
PHYS 120, General Physics	4
CIS 121, Computer Mathematics	3
Program Elective	3
	Total 14
Spring, Fourth Semester	
MATH 220, Linear Algebra	4
MATH 230, Introduction to Ordinary Differential Equations	4
ENGR 230, Circuit Analysis	4
GE requirement Area F (recommended HIST 110)	3
	Total 15
	Degree Total 60

Electrical Engineering

The Associate in Sciences in Electrical Engineering will provide students with a fundamental knowledge of Electrical Engineering, to enhance their computational and problem solving skills, sharpen their critical thinking, and to ensure proper preparation for junior level Electrical Engineering coursework at a university. Students completing this degree should realize that there are many sub disciplines in Electrical Engineering and most require a similar core education, but not all. The requirements for an associate degree in Electrical Engineering may be satisfied by completing the courses listed below in addition to the associate degree requirements. (See Graduation/Associate Degree Requirements.)

Required Courses (48 units):	**units**
CIS 161, Introduction to C Programming	3
ENGR 110, Engineering Orientation and Basic Skills	3
ENGR 125, Programming and Problem Solving in MATLAB	4
ENGR 185, Digital Logic and Design	4
ENGR 230, Circuit Analysis	4
MATH 150, Calculus and Analytic Geometry	5
MATH 160, Calculus and Analytic Geometry	4
MATH 230, Introduction to Ordinary Differential Equations	4
MATH 250, Calculus and Analytic Geometry	4
PHYS 110, General Physics	4
PHYS 120, General Physics	4
PHYS 211, General Physics	5
	Total 48

Except in cases of a prerequisite requirement, it is not required to take courses in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Pathway	
Fall, First Semester	**units**
ENGR 110, Engineering Orientation and Basic Skills	3
MATH 150, Calculus and Analytic Geometry (GE Area D2)	5
GE requirement Area D1 (ENGL 101)	3
GE requirement Area B (recommended POLS 101)	3
	Total 14
Spring, Second Semester	
CIS 161, Introduction to C Programming (GE Area E)	3
ENGR 125, Programming and Problem Solving in MATLAB	4
MATH 160, Calculus and Analytic Geometry	4
PHYS 110, General Physics (GE Area A)	4
	Total 15
Fall, Third Semester	
ENGR 185, Digital Logic and Design	4
MATH 250, Calculus and Analytic Geometry	4
PHYS 120, General Physics	4
GE requirement Area C (recommended THA 101)	3
	Total 15
Spring, Fourth Semester	
ENGR 230, Circuit Analysis	4
MATH 230, Introduction to Ordinary Differential Equations	4
PHYS 211, General Physics	5
GE requirement Area F (recommended FTV 201)	3
	Total 16
	Degree Total 60

Mechanical Engineering

The Associate in Sciences in Mechanical Engineering will provide students with a fundamental knowledge of Mechanical Engineering, to enhance their computational and problem solving skills, sharpen their critical thinking, and to ensure proper preparation for junior level Mechanical Engineering coursework at a university. Students completing this degree should realize that there are many sub disciplines in Mechanical Engineering and most require a similar core education, but not all. The requirements for an associate degree in Mechanical Engineering may be satisfied by completing the courses listed below in addition to the associate degree requirements. (See Graduation/Associate Degree Requirements.)

Required Courses (48 units):	**units**
CHEM 110, General Chemistry	5
ENGR 110, Engineering Orientation and Basic Skills	3
ENGR 125, Programming and Problem Solving in MATLAB	4
ENGR 130, Materials Science	4
ENGR 140, Engineering 3D Graphics	3
ENGR 210, Statics	4
MATH 150, Calculus and Analytic Geometry	5
MATH 160, Calculus and Analytic Geometry	4
MATH 230, Introduction to Ordinary Differential Equations	4
MATH 250, Calculus and Analytic Geometry	4
PHYS 110, General Physics	4
PHYS 120, General Physics	4
	Total 48

Except in cases of a prerequisite requirement, it is not required to take courses in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Pathway	
Fall, First Semester	**units**
CHEM 110, General Chemistry (GE Area A)	5
ENGR 110, Engineering Orientation and Basic Skills	3
MATH 150, Calculus and Analytic Geometry (GE Area D2)	5
	Total 13
Spring, Second Semester	
ENGR 125, Programming and Problem Solving in MATLAB	4
MATH 160, Calculus and Analytic Geometry	4
PHYS 110, General Physics (GE Area E)	4
GE requirement Area D1 (ENGL 101)	3
	Total 15
Summer	
ENGR 130, Materials Science	4
	Total 4
Fall, Third Semester	
ENGR 140, Engineering 3D Graphics	3
MATH 230, Introduction to Ordinary Differential Equations	4
PHYS 120, General Physics	4
GE requirement Area C (recommended THA 101)	3
	Total 14
Spring, Fourth Semester	
ENGR 210, Statics	4
MATH 250, Calculus and Analytic Geometry	4
GE requirement Area B (recommended POLS 101)	3
GE requirement Area F (recommended FTV 201)	3
	Total 14
	Degree Total 60

Transfer

Students planning to continue studies at a four-year college or university after AVC should visit the Transfer Resource Center and consult with a counselor as soon as possible. Additional information on official transfer articulation agreements from AVC to many CSU/UC campuses can be found at www.assist.org

Prerequisite Completion

All prerequisite courses must be completed with a satisfactory grade in order to enroll in the next course. According to Title 5, Section 55200(d), a satisfactory grade is a grade of "A," "B," "C" or "P". Classes in which the Pass/No Pass option is available are indicated with an asterisk **(*)** before the course title. See "Pass/No Pass Option" in the catalog for full explanation.

Engineering Courses

ENGR 110 *INTRODUCTION TO ENGINEERING

3 units
3 hours weekly
Prerequisite: *Completion of MATH 135.*
The course explores the branches of engineering, the functions of an engineer, and the industries in which engineers work. Explains the engineering education pathways and explores effective strategies for students to reach their full academic potential. Presents an introduction to the methods and tools of engineering problem solving and design including the interface of the engineer with society and engineering ethics. Develops communication skills pertinent to the engineering profession. (C-ID: ENGR 110) (CSU, UC, AVC)

ENGR 125 PROGRAMMING AND PROBLEM-SOLVING IN MATLAB

4 units
6 hours weekly [3 lecture, 3 lab]
Prerequisite: *Completion of MATH 150.*
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. (C-ID: ENGR 220) (CSU, UC, AVC)

ENGR 130 MATERIALS SCIENCE

4 units
6 hours weekly [3 lecture, 3 lab]
Prerequisite: *Completion of CHEM 110 and PHYS 110.*
This course presents the internal structures and resulting behaviors of materials used in engineering applications, including metals, ceramics, polymers, composites, and semiconductors. The emphasis is upon developing the ability both to select appropriate materials to meet engineering design criteria and to understand the effects of heat, stress, imperfections, and chemical environments upon material properties and performance. (C-ID: ENGR 140B) (CSU, UC, AVC)

ENGR 140 ENGINEERING 3D GRAPHICS

3 unit
6 hours weekly [3 lecture, 3 lab]
Prerequisite: *Completion of MATH 135 or placement by multiple measures.*
This course covers the principles of engineering drawings in visually communicating engineering designs and an introduction to computer-aided design (CAD). Topics include the development of visualization skills; orthographic projections; mechanical dimensioning and tolerancing practices; and the engineering design process. Assignments develop sketching and 2-D and 3-D CAD skills. The use of CAD software is an integral part of the course. (C-ID: ENGR 150) (CSU, UC, AVC)

ENGR 185 *DIGITAL LOGIC AND DESIGN

4 units
6 hours weekly [3 lecture, 3 lab]
Advisory: *Completion of ENGL 101 or placement by multiple measures.*
Prerequisite: *Completion of MATH 135 or placement by multiple measures.*
This course covers discrete mathematics, logic Boolean algebra, binary arithmetic, logic gates, combinatorial logic, and minimization techniques. Includes an introduction to sequential circuits, state machines and synchronous state machine design. Students will design combinatorial circuits, flipflops, multivibrators, registers and counters. (CSU, UC, AVC)

ENGR 199 *OCCUPATIONAL WORK EXPERIENCE

1–8 units
hours vary
Prerequisite: *To participate in work experience, students must have a job or internship which is either paid or voluntary and have the approval of the supervisor and instructor supervising work experience in the specific subject area. PRIOR TO ENROLLING, students must attend a scheduled orientation or meet individually with the supervising instructor for an individual orientation.*
Occupational Work Experience Education is supervised employment designed to provide students a realistic learning experience through work. The ultimate goal is to teach students those skills and attitudes that will equip them to function and adapt as an employee in a variety of situations and jobs. Occupational Work Experience Education is supervised employment extending classroom-based occupational learning at an on-the-job learning station related to the student's educational major or occupational goal. Credit may be accrued at the rate of one to eight units per semester. For the satisfactory completion of all types of Cooperative Work Experience Education (WE 197 and WE 199), students may earn up to a total of sixteen semester credit hours. (CSU, AVC) **(R3)**

ENGR 210 STATICS

4 units
4 hours weekly
Prerequisite: *Completion of MATH 160 and PHYS 110.*
A first course in engineering mechanics: properties of forces, moments, couples and resultants; two- and three-dimensional force systems acting on engineering structures in equilibrium; analysis of trusses, and beams; distributed forces, shear and bending moment diagrams, center of gravity, centroids, friction, and area and mass moments of inertia. Optional additional topics include fluid statics, cables, Mohr's circle and virtual work. (C-ID: ENGR 130) (CSU, UC, AVC)

ENGR 220 *STRENGTH OF MATERIALS

3 units
3 hours weekly
Prerequisite: *Completion of ENGR 210.*
This course is a study of stresses, strains and deformations associated with axial, torsional and flexural loading of bars, shafts and beams, as well as pressure loading of thin-walled pressure vessels. The course also covers stress and strain transformation, Mohr's Circle, ductile and brittle failure theories, and the buckling of columns. Statically indeterminate systems are also studied. (C-ID ENGR 240) (CSU, UC, AVC)

ENGR 230 CIRCUIT ANALYSIS

4 units
6 hours weekly [3 lecture, 3 lab]
Prerequisite: *Completion of PHYS 120.*
Corequisite: *Completion of or concurrent enrollment in MATH 230.*
An introduction to the analysis of electrical circuits. Use of analytical techniques based on the application of circuit laws and network theorems. Analysis of DC and AC circuits containing resistors, capacitors, inductors, dependent sources, operational amplifiers, and/or switches. Natural and forced responses of first and second order RLC circuits; the use of phasors; AC power calculations; power transfer; and energy concepts. (C-ID ENGR 260 & 260L) (CSU, UC, AVC)