

Definition

The Electrical Technology program is intended to provide students with the opportunity to begin a career in the electrical technology occupation. The courses will provide the students with exposure to residential, commercial and industrial electrical techniques and practices. This exposure will provide them with the versatile job skills to build upon and flex during changing economic conditions.

Staff

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Program Description

This program will help students gain the skills and knowledge necessary to install, maintain and troubleshoot a variety of electrical systems. These include residential wiring, commercial/industrial wiring and cabling, National Electric Code, troubleshooting and maintenance, motor controls and programmable logic control. The program gives students theory and “hands-on” practical experience related to all aspects of this occupation.

Successful students will gain experience in basic electricity, proper use of tools and test equipment, residential and commercial installations, the National Electric Code and electrical maintenance and repair.

California State Approved Program

The Electrical Technology Program at AVC is approved to offer the full curriculum for students through the State of California’s Electrical Certificate Curriculum Committee. Upon enrollment in the courses, students will be able to apply for their electrical trainee number. After completion of the certificate, the student will be eligible to take the California State Electrical Journeyman’s exam. Any courses offered in this program will satisfy the recertification for journeyman electrician.

Career Options

Electrical or Commercial	Electrician
Electrical Installer	Industrial Maintenance
Electrical Maintenance Technician	Electrician

(Careers may require education beyond the two-year college level.)

Program Learning Outcomes

1. Calculate values for voltage, current, resistance, and power, and contrast these values with measured values to determine the proper operation of a variety of electrical circuits.
2. Analyze, evaluate, troubleshoot, and repair residential, commercial, and industrial electrical systems to meet industry standards and the National Electric Code.
3. Read and interpret blueprints, architectural drawings and schematics to install, maintain and repair electrical systems.
4. Evaluate the operation of various motor control systems, including programmable control systems, and modify or repair as necessary.

Certificate Program

Required Courses (34 units):

	units
ELEC 110, Fund. of Electricity	4
ELEC 115, Electrical Codes and Ordinances	4
ELEC 120, Residential Wiring	4
ELEC 130, Alternating Current Theory	3
ELEC 140, Commercial/Industrial Wiring and Cabling	4
ELEC 150, Electrical Maintenance	4
ELEC 160, Fundamentals of Motor Control	4
ELEC 220, Advanced Motor Control	4
ELEC 250, Electricians Journeyman Review	3
Total	34

For a recommended plan of study, please refer to the Associate Degree plan minus the general education requirements.

Associate Degree

The requirements for an associate degree in Electrical Technology may be satisfied by completing 34 units of required courses, 21 units of general education requirements, and sufficient elective credits to total 60 units. (See Graduation/Associate Degree Requirements.)

Students who complete the associate degree have enhanced employability in the field as an Electrician. They have better chances for promotional opportunities into supervisory and management positions as they gain experience. The associate degree will also provide students with a broad range of knowledge with which to appreciate the environment, the culture, and the society in which they live. With the associate degree the student will have the ability to think and communicate clearly and effectively.

Recommended Plan of Study

	units
First Semester	
ELEC 110, Fund. of Electricity	4
ELEC 115, Electrical Codes and Ordinances	4
ELEC 120, Residential Wiring	4
GE requirement Area D1	3
Total	15
Second Semester	
ELEC 130, Alternating Current Theory	3
ELEC 140, Commercial/Industrial Wiring and Cabling	4
ELEC 160, Fundamentals of Motor Control	4
GE requirement Area A	3
Total	14
Third Semester	
ELEC 150, Electrical Maintenance	4
GE requirement Area B	3
GE requirement Area D2	3
GE requirement Area E	3
Elective	2
Total	15
Fourth Semester	
ELEC 220, Advanced Motor Control	4
ELEC 250, Electricians Journeyman Review	3
GE requirement Area C	3
GE requirement Area F	3
Elective	3
Total	16
Degree Total	60

NOTE: Semester order and time to complete will vary for night students.

Transfer

Not a transfer major.

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.

Electrical Technology Courses

ELEC 110 *FUNDAMENTALS OF ELECTRICITY

*4 units
6 hours weekly [3 lecture, 3 lab]*

Basic concepts of electricity with emphasis on the fundamental laws of electricity and magnetism and the practical application of those laws. Experimental verification of these laws with laboratory practice to support the theory. Students will be provided a foundation in electricity for vocational areas including: electronics, electrical, auto, appliance repair, refrigeration and air conditioning. (AVC)

ELEC 115 *ELECTRICAL CODES AND ORDINANCES

*4 units
4 hours weekly*

Prerequisite: Completion or concurrent enrollment in ELEC 110.

This course is designed to provide students with knowledge and familiarization of the electrical codes used in California including technical requirements, governing bodies and enforcement. The class will cover different areas of the National Electrical Code (NEC) and will build on the student's foundation of knowledge and skills to maintain or modify the electrical system in a residential, commercial or industrial environment. Close adherence to the NEC will be observed, resulting in safe wiring practices. Basic formulas necessary to understand electrical theory and applications are presented as they are needed throughout the class. (AVC) **(R unlimited*)**

* Course repeatability allowed for mandated training as stated in Title 5, Sections 55763(c) and 58161(c).

ELEC 120 *RESIDENTIAL WIRING

*4 units
4 hours weekly*

Prerequisite: Completion or concurrent enrollment in ELEC 110.

This course is designed for students who want to learn the applications, selection and installation techniques of the most common electrical devices used in homes and apartment buildings. Course of study includes the basic theory of wiring circuits, blueprint reading, materials selection, installation, and code requirements with hands-on application. Provides additional instruction on wiring practices in accordance with the National Electrical Code. Students will be able to perform and troubleshoot most common installations encountered in residential applications. (AVC)

ELEC 130 *ALTERNATING CURRENT THEORY

*3 units
3 hours weekly*

Prerequisite: Completion of ELEC 110.

Builds on the student's knowledge of electrical theory. Experiments with the interaction between magnetism, generators, transformers, motors, and how it applies to the AC circuit. Inductance and capacitance theories are introduced. Practical application of electrical circuits in residential, commercial and industrial setting. Construction requirements of single phase/3-phase systems, and electrical safety. (AVC)

ELEC 140 *COMMERCIAL/INDUSTRIAL WIRING AND CABLING*4 units**6 hours weekly [3 lecture, 3 lab]***Prerequisite:** Completion or concurrent enrollment in ELEC 110.

Builds on the student's knowledge of electrical theory and wiring practices to install, repair and maintain electrical circuits in a commercial/industrial setting. Construction activities will cover tool identification, blueprint/symbol identification, conduit bending, wire pulling, rigging and electrical test equipment. Close attention will be paid to the National Electrical Code requirements with emphasis on installation of electrical equipment and controls. Records of amps, volts, and watts will be kept. Students will be instructed on how to use this information for optimum utilization of power in the commercial/industrial setting. Formulas necessary to understand the electrical theory and applications will be presented as they are needed throughout the class. (AVC)

ELEC 150 *ELECTRICAL MAINTENANCE*4 units**6 hours weekly [3 lecture, 3 lab]***Prerequisite:** Completion or concurrent enrollment in ELEC 110.

Students will progress from basic electrical diagram symbols and processes to advanced machinery troubleshooting in an industrial plant. CAL-OSHA requirements to prevent hazards from electrical shock, moving machinery and stored energy will be taught then implemented in a lab setting. The interaction between electrical, mechanical, hydraulic and pneumatic machinery and controls will be taught in a variety of lecture and lab settings using a variety of meters. The students will gain knowledge by developing a preventive maintenance program designed to reduce downtime and minimize production loss. (AVC)

ELEC 160 *FUNDAMENTALS OF MOTOR CONTROL*4 units**6 hours weekly [3 lecture, 3 lab]***Prerequisite:** Completion of ELEC 110.

Builds on the student's knowledge of electrical theory and apply this knowledge to electrical motor control. Close attention paid to the National Electrical Code requirements and NEMA requirements. Emphasis placed on installation, maintenance and modification of motor control, presented in a present-day setting. Students will learn new electrical symbols theory, and progress through such topics as circuit layout, control pilot devices, control circuits, reduced voltage starters and multi-speed controllers. Formulas necessary to understand and work with the electrical theory and applications are presented as they are needed throughout the class. (AVC)

ELEC 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. (AVC) (R3)

ELEC 220 *ADVANCED MOTOR CONTROL-PLC*4 units**4 hours weekly***Prerequisite:** Completion of ELEC 160.

This course is designed to build on the student's knowledge of electrical motor control and introduces the basic theory, operation and programming of programmable logic controllers. Students learn PLC hardware components, system configuration, and relay ladder logic concepts. The topics will include configuration, operation, input/output devices, and basic PLC programming. Upon completion students will be able to identify components, troubleshoot control systems, and design basic control programs. (AVC)

ELEC 250 *ELECTRICIANS JOURNEYMAN REVIEW*3 units**3 hours weekly***Advisory:** Completion of ELEC 115.

A series of sample tests and lectures intended for students who are preparing for the National Electrical Code (NEC) portion of the state journeyman exam. Provides a quick, easily understood study guide for those needing to update themselves on the NEC and the basic electrical mathematical formulas needed in the electrical field. Gain proficiency in the use of the NEC table of contents, the index and the ability to move quickly from cover to cover to find the answer to each question in a timely manner. (AVC) (R unlimited*)

* Course repeatability allowed for mandated training as stated in Title 5, Sections 55763(c) and 58161(c).