

170 Electrical Technology

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

To access faculty and staff, dial (661) 722-6300, then the 4-digit extension.

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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 and commercial wiring, National Electric Code, electric motors, industrial electrical systems and motor control systems. 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.

Students must receive a minimum grade of "C" or better in all required core courses and the specific courses listed as program electives in order to qualify for the degree or certificate.

Career Options

Electrical or Commercial Electrical
Installer

Electrical Maintenance Technician
Electrician

Industrial Maintenance Electrician
(Some of these careers may require education beyond the two-year college level.)

Certificate Program

The following courses (34 units) are required for the certificate.

Required Courses	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 for the certificate, 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

First Semester	units
ELEC 110, Fund. of Electricity	4
ELEC 115, Electrical Codes and Ordinances	4
ELEC 120, Residential Wiring	4
Course from GE requirement Area D1	3
Total	15

Second Semester	units
ELEC 130, Alternating Current Theory	3
ELEC 140, Commercial/Industrial Wiring and Cabling	4
ELEC 160, Fundamentals of Motor Control	4
Course from GE requirement Area A	3
Total	14

Third Semester	units
ELEC 150, Electrical Maintenance	4
Course from GE requirement Area B	3
Course from GE requirement Area D2	3
Course from GE requirement Area E	3
Elective	2
Total	15

Fourth Semester	units
ELEC 220, Advanced Motor Control	4
ELEC 250, Electricians Journeyman Review	3
Course from GE requirement Area C	3
Course from 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

If a course is listed as a prerequisite for another course, that prerequisite course 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 hours lecture, 3 hours lab)

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

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 of ELEC 110 (formerly TECH 120) or concurrent enrollment.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

Familiarization with the electrical codes used in California including technical

requirements, governing bodies and enforcement. A residential setting will be used to teach code requirements. The class will cover 50 percent of the National Electrical Code (NEC) and will build on the students foundation of knowledge and skills to maintain or modify the electrical system in a residence. 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) (RI)

ELEC 120 *RESIDENTIAL WIRING

4 units

4 hours weekly

Prerequisite: Completion of ELEC 110 (formerly TECH 120) or concurrent enrollment.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

Build a foundation of knowledge and skills needed to maintain or modify the electrical system in a residence. Close adherence to the National Electrical Code will be observed, resulting in safe wiring practices. Ability to secure permits and pass electrical inspection will be observed by the instructor. Basic formulas necessary to understand electrical theory and applications are presented as they are needed throughout the class. (AVC)

ELEC 130 *ALTERNATING CURRENT THEORY

3 units

3 hours weekly

Prerequisite: Completion of ELEC 110.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

Builds on the student's knowledge of electrical theory. Experiment with the interaction between magnetism, generators, transformers and the AC circuit. Students will analyze circuits using ladder diagrams. Inductance and capacitance theories are introduced. Practical application of electronics in an industrial setting. Construction requirements of 3-phase systems, and electrical safety. (AVC)

ELEC 140 *COMMERCIAL/ INDUSTRIAL WIRING AND CABLING

4 units

6 hours weekly

(3 hours lecture, 3 hours lab)

Prerequisite: Completion of ELEC 115 or concurrent enrollment.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

Build 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 and use, material identification, blueprint/symbol identification, conduit bending, wire pulling, rigging and electrical test instruments. 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 hours lecture, 3 hours lab)

Prerequisite: Completion of ELEC 115.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

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 student 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 hours lecture, 3 hours lab)

Prerequisite: Completion of ELEC 110.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

Build 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 *WORK EXPERIENCE

1-4 units

hours vary

Prerequisite: Students must be registered in at least 7 units (including the Work Experience units) and have approval of instructor supervising work experience subject area. Prior to enrolling, students must attend a scheduled orientation.

The Work Experience program provides supervised employment extending classroom-based learning to an on-the-job learning situation. Students meet with instructor by arrangement to discuss learning objectives, along with experiences and/or problems arising on the job. (CSU, AVC) (R3)

ELEC 220 *ADVANCED MOTOR CONTROL-PLC

4 units

4 hours weekly

Prerequisite: Completion of ELEC 160.

Advisory: Eligibility for ENGL 099, READ 099, and MATH 070.

Build on the student's knowledge of electrical motor control. Close attention paid to the National Electrical Code requirements and NEMA requirements. Students will learn new electrical symbols

theory and progress through such topics as circuit layout, control pilot devices, control circuits, reduced voltage starters, multi-speed controllers and expand on control concepts into the Program Logic Control (PLC) field. Formulas necessary to understand and work with the electrical theory and applications are presented as they are needed throughout the class. (AVC)

ELEC 250 *ELECTRICIANS JOURNEYMAN REVIEW

3 units

3 hours weekly

Advisory: Completion of ELEC 115, and Eligibility for ENGL 099, READ 099, and MATH 070.

A series of tests and lectures intended for students and electricians 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)