ELECTRICAL TECHNOLOGY, AUTOMATION TECHNICIAN

Associate in Science Degrees

- Electrical Technology, Automation Technician - Associate in Science (https://lbcc-public.courseleaf.com/degrees-certificates/electrical-technology-automation-technician/electrical-technology-automation-technician-as/)

Certificates of Achievement

- Automation Technician - Certificate of Achievement (https://lbcc-public.courseleaf.com/degrees-certificates/electrical-technology-automation-technician/automation-technician-certificate-achievement/)
- Electrical Technology, Automation Technician - Certificate of Achievement (https://lbcc-public.courseleaf.com/degrees-certificates/electrical-technology-automation-technician/electrical-technology-automation-technician-certificate-achievement/)

ELECT 41 1.5 units
Computer Applications for Tech Reports
18 hours lecture, 36 hours laboratory
Corequisite: ELECT 600.
Grading: letter grade.
The course will consist of an introduction to the various software programs used in the electrical technology program. Students will develop all the components of a complete engineering technical report. The course will utilize computer applications to research and complete technical reports and documentation. Included are Computer Aided Design software, Word, Excel, Visio, Constructor, and web-based communication and information research.
Transferable to CSU Only

ELECT 202 3 units
Electrical Mathematics
54 hours lecture
Corequisite: ELECT 600.
Grading: letter grade.
This course is designed for students enrolled in the Electrical Technology Program or Industry professionals coming back to complete continuing education units. This course covers the learning and application of mathematics and pre-algebra needed in the electrical industry. Faculty will utilize guided learning activities to help students to take meaningful measurements and apply mathematics and electrical formulas to solve problems. Students will learn how to apply topics such as arithmetic, fractions, decimals, percentages, graphing, measurement, and pre-algebra to better understand how to solve electrical formulas.

ELECT 204 4 units
First Semester Fundamentals of DC Electricity
54 hours lecture, 54 hours laboratory
Prerequisite: ELECT 600 and ELECT 202 or ELECT 602 or MATH 110 or higher.
Grading: letter grade.
This course is an introduction to direct current electrical theory, its practices, applications, nomenclature and components for students beginning electrical studies for occupational goals, continuing university education or for increasing skill levels. Included in this course are formulas used in electrical theory, information regarding proper use and selection of hand tools, materials, and wiring as practiced in the electrical maintenance and construction industry. In addition, extensive hand-on lab exercises are provided to reinforce these concepts.

ELECT 209 4 units
Second Sem Fund of Motors/Generators
54 hours lecture, 54 hours laboratory
Prerequisite: ELECT 202 and ELECT 204.
Grading: letter grade.
This course covers the operational theory and practices associated with motors and generators. This includes theory associated with motors, generators, motor controls, circuit diagrams, and wiring practices in the electrical maintenance and construction industry. In addition, extensive hand-on lab exercises are provided to reinforce these concepts.

ELECT 212 4 units
Third Semester Fund of AC Electricity
54 hours lecture, 54 hours laboratory
Prerequisite: ELECT 225 and ELECT 209.
Grading: letter grade.
This course is an introduction to alternating current theory, practices and applications with studies of nomenclature and components. It is an advanced course that requires previous direct current electrical coursework and math including right angle trigonometry. In addition, extensive hand-on lab exercises are provided to reinforce these concepts.

ELECT 214 4 units
Fourth Semester AC Principles & Pract
54 hours lecture, 54 hours laboratory
Prerequisite: ELECT 212.
Grading: letter grade.
This is an advanced course that requires knowledge of AC circuitry, systems, and components. This course covers the complete electrical design of a commercial/industrial facility inclusive of general electrical, AC motors, lighting, transformers and electrical load calculations. All design work is completed to applicable codes. In addition, extensive hand-on lab exercises are provided to reinforce these concepts.

ELECT 225 4 units
Algebra and Trigonometry for Technicians
72 hours lecture
Prerequisite: ELECT 202 or ELECT 602 or MATH 110 or higher.
Corequisite: ELECT 600.
Grading: letter grade.
Formerly MATH 225. This course will present basic algebra and trigonometry and their application to the solution of practical problems in technical (mechanical, electrical, construction) fields. This course is not open for credit to students registered in or with credit in MATH 225, 220, 230, 110 and 150.

ELECT 227 2 units
Variable Speed Drive Fundamentals
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 204 or ETEC 40.
Grading: letter grade.
This course covers the theory, circuit designs and application of direct current and alternating current variable speed drives. Topics include basic fabrication techniques, semiconductor usage, and control of both DC and AC Drives. Students will work through testing and troubleshooting exercises as well as determine the proper speed drives for specific applications.

ELECT 230A 2 units
Robotics Technology - Design
18 hours lecture, 54 hours laboratory
Grading: letter grade.
This course utilizes the engineering model of design, system integration and applications development as applied to the area of industrial and marine robotics technology, including power and control systems, troubleshooting, hydraulic and pneumatic systems, programming fundamentals, and issues relating to the operation of electrical equipment in harsh environments. Students may start the series in any segment to develop skills specific to each topic.

ELECT 230B 2 units
Robotics Technology - Integration
18 hours lecture, 54 hours laboratory
Grading: letter grade.
This course utilizes the engineering model of design, system integration and applications development as applied to the area of industrial and marine robotics technology, including power and control systems, troubleshooting, hydraulic and pneumatic systems, programming fundamentals, and issues relating to the operation of electrical equipment in harsh environments. Students may start the series in any segment to develop skills specific to each topic.

ELECT 231 2 units
Electro-Hydraulics and Pneumatic Systems
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 204 or ETEC 40.
Grading: letter grade.
This course covers the operation and troubleshooting of electro-hydraulic and electro-pneumatic (fluid power) systems. Control of fluid power systems with automation devices including Programmable Logic Controllers (PLCs) is included. This is a hands-on course with work on operating hydraulic and pneumatic actuators and controls.

ELECT 240 3 units
Introduction to National Electrical Code
54 hours lecture
Prerequisite: ELECT 204.
Grading: letter grade.
This course is an introduction to National Electrical Code. The interpretation of electrical wiring diagrams, material use, installation methods and calculation of electrical loads to size feeders and conductors is included.

ELECT 242 1.5 units
Electrical Code-Grounding
27 hours lecture
Prerequisite: ELECT 240.
Grading: letter grade.
This course covers National Electrical Code requirements for grounding. Grounding system components, principles of operation, design and fault current calculations are included.

ELECT 245 3 units
Electrical Code-Commercial
54 hours lecture
Prerequisite: ELECT 240.
Grading: letter grade.
This course covers National Electrical Code requirements for commercial, office and light industrial wiring. The electrical layout and design of commercial buildings, feeder circuit calculations, branch circuit calculations and circuit over current protection are included.

ELECT 246 2 units
NFPA 70E for Manufacturing
36 hours lecture
Prerequisite: ELECT 240.
Grading: letter grade.
The NFPA 70E is an industry consensus standard for electrical safety in the workplace. This standard provides practical methods for protecting personnel from electrical workplace hazards. Students will learn how to identify factors relating to electrical safety and how to properly correct these problems. Safe workplace practices and the selection of proper personal protective equipment will be covered.

ELECT 247 1 units
Electrical Code-Solar
18 hours lecture
Prerequisite: ELECT 240.
Grading: letter grade.
This course covers aspects of the National Electrical Code and Article 690 as they pertain to solar electrical installations and associated equipment. Safety, installation, grounding, bonding and vehicle chargers are among the items covered.

ELECT 250 3 units
Electrical Code-Industrial
54 hours lecture
Prerequisite: ELECT 240.
Grading: letter grade.
This course covers National Electrical Code requirements for industrial applications. Materials and wiring methods for heavy industrial applications, life, safety and hazardous systems are included.

ELECT 253 2 units
OSHA Standards for Construction Safety
36 hours lecture
Corequisite: ELECT 600.
Grading: pass/no pass.
This course covers Occupational Safety and Health Administration (OSHA) policies, procedures, and standards, with emphasis on safety and health principles in the construction trades. Topics include Industrial Hygiene, Managing Safety and Health through the hierarchy of controls as applied to the OSHA construction standards. Special attention is given to those areas that are extremely hazardous and often result in serious injury to construction workers. Upon successful course completion with meeting OSHA attendance requirements, the student will receive an OSHA Department of Labor (DOL) 30 Hour Construction Outreach Training Completion Card.

ELECT 256 1 units
High Voltage Safety Awareness
18 hours lecture
Prerequisite: ELECT 240 and ELECT 253.
Grading: letter grade.
The focus of this course is on voltages over 600 volts, which in the workplace presents unique and potentially deadly hazards to employees. The course covers the recommended best safety practices, personal protective equipment, and safe approach distances for working with voltages between 600 volts and 16k volts. Industry standards from OSHA (Occupational Safety and Health Administration) and NFPA 70E (National Fire Protection Association) are covered.

ELECT 262 3 units
Solar 1-Grid-Tied Solar Photovoltaics
45 hours lecture, 27 hours laboratory
Prerequisite: ELECT 200B or ELECT 209.
Grading: letter grade.
This level 1 lecture/laboratory electrical course will introduce students to the components that make up a photovoltaic (PV) system and the function of each. Students will also learn how to install, troubleshoot, and maintain a residential solar electric system.

ELECT 263 3 units
Solar 2-Advanced Solar Photovoltaics
45 hours lecture, 27 hours laboratory
Prerequisite: ELECT 262.
Grading: letter grade.
In this level 2 lecture/laboratory course students build upon skills learned in ELECT 262 to design and implement a cost-effective stand-alone photovoltaic (PV) system with battery backup. Students will also learn how to analyze data from system monitoring hardware and software, and use that data to adjust a PV system for optimal performance.

ELECT 265 2 units
Conductors
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 212.
Grading: letter grade.
This course provides an understanding of how to identify and interpret AC single-line and three-line diagrams, connection and interconnection drawings, electrical symbols, and ANSI device numbers associated with electrical equipment. Students will learn to verify correct type and ratings of Low and Medium voltage power cables to include shielding requirements. Students will learn methods and procedures for testing cables and interpreting test data. InterNational Electrical Testing Association (NETA) standards are adhered to in this course.

ELECT 266 2 units
Circuit Breakers
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 212.
Grading: letter grade.
This course is an overview of the construction, application, function, operation, testing, and analyzation of test results of molded-case, insulated-case, and power-type circuit breakers and switches. It is a course that requires previous Alternating Current electrical coursework and math. InterNational Electrical Testing Association (NETA) standards are adhered to in this course.

ELECT 267 2 units
Switchgear and Switchboards
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 212.
Grading: letter grade.
This course discusses the operation and servicing of Switchgear, Switchboards, and Motor Control Centers, their function as a system, their operational control logic, motor starting methods, all to ANSI/NETA maintenance and testing specifications. This course requires previous coursework in Alternating Current Electricity. InterNational Electrical Testing Association (NETA) standards are adhered to in this course.

ELECT 268 2 units
Transformers
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 212.
Grading: letter grade.
This course describes the basic applications of power distribution transformers, consisting of two or more coupled windings, in single and three-phase systems and defines transformer winding configurations for step-up or step-down operation and the various ancillary components incorporated to monitor and cool windings. Students will learn the various electrical tests used to analyze transformer windings, and identify the transformer's ability to operate within the energized electrical system. InterNational Electrical Testing Association (NETA) standards are adhered to in this course.

ELECT 271 3 units
Electrical Cost Estimating 1
54 hours lecture
Prerequisite: ELECT 277.
Grading: letter grade.
This course will present an introduction to electrical cost estimating, including take-off and listing procedures. It is designed for students preparing to enter electrical estimating occupations or electrical contracting work.

ELECT 275 1 units
Electrical Pipe Bending
9 hours lecture, 27 hours laboratory
Prerequisite: ELECT 225.
Grading: letter grade.
This course is a study of how to properly calculate, layout and bend Electrical Metallic Tubing (EMT) and Rigid Metal Conduit (RMC). Methods taught include hand bending and the use of mechanical and machine benders per Industry standards and National Electrical Code (NEC) standards.

ELECT 277 3 units
Blueprint Reading for Electricians
54 hours lecture
Prerequisite: ELECT 212.
Grading: letter grade.
This course is designed for students to comprehend, and correctly interpret blueprints used in the electrical and related construction trades.

ELECT 280 3 units
Traffic Signal Systems 1
45 hours lecture, 27 hours laboratory
Recommended Preparation: ELECT 204.
Grading: letter grade.
This first course in traffic signal systems includes instruction on the building and wiring of a working intersection. CalTrans and NEC Standards and requirements, copper wiring, controller, pole and signal head installation, and controller theory are covered in this hands-on course.

ELECT 283 3 units
Traffic Systems Communications
45 hours lecture, 27 hours laboratory
Recommended Preparation: ELECT 204.
Grading: letter grade.
This course provides instruction in Traffic Signal Communications Systems. The course content will cover communications theory, microwave, VHF/UHF radios, vision monitoring and detection, antenna systems. This hands-on course will further include the testing and troubleshooting of communications systems.

ELECT 284 3 units
Traffic Signal Controllers & Digital Systems
45 hours lecture, 27 hours laboratory
Prerequisite: ELECT 204.
Grading: letter grade.
This is a course in digital logic and microprocessor controls as applied to Traffic Signal Systems. This hands-on course will include troubleshooting of digital traffic controllers. Course topics will include, but are not limited to, interface logic, electronics, and theory of system operation.

ELECT 285 2 units
Traffic Signal Inspection and Safety
36 hours lecture
Prerequisite: ELECT 280 and ELECT 284.
Grading: letter grade.
This course covers the processes necessary for the proper inspection of traffic signal systems. Topics will include areas of inspection and proper inspection methods. Additional topics in safety as it relates to traffic signals will be covered.

ELECT 400 2 units
Electrical Certification Exam Prep
36 hours lecture
Grading: pass/no pass.
This course prepares students to take the California Electrician Certification Exam. It includes testing methods, rapid code lookup, code calculations and applications. This course cannot be used for credit toward the certificate or degree in Electrical Technology.

ELECT 435A 2 units
Motor Control Wiring and Troubleshooting
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 209.
Grading: letter grade.
This course covers the theoretical and practical principles involving the control of direct and alternating current electric motors. Industry standard wiring practices and troubleshooting methods are covered. An introduction to Programmable Logic Controllers (PLCs) is included. Mandatory safety awareness assessment will be conducted early in the course.

ELECT 435B 2 units
Programmable Logic Controllers (PLC) 1
18 hours lecture, 54 hours laboratory
Prerequisite: ELECT 435A.
Grading: letter grade.
This course consists of advanced theoretical and practical principles involving the control of direct and alternating current electric motors and automation systems. Topics covered include Programmable Logic Controllers (PLCs), ladder logic, wiring, timing and programming. GE Fanuc PLCs and GE Proficy software are utilized.

ELECT 600 0 units
Electrical Program & Safety Preparation
9 hours lecture
Grading: non graded.
This is a preparation and orientation course for the Electrical Technology Program. Students planning on enrolling in either the ELECT or CISCO series of classes must complete this class. Topics covered will include curriculum guide navigation, electrician trainee status, program completion certificates, program math requirements and substitutions, Associate Degree requirements, student safety and personal protective equipment, expectations of students in the program and examples of expected work product.

ELECT 601 0 units
Computer Applications for Tech Reports
18 hours lecture, 36 hours laboratory
Corequisite: ELECT 600.
Grading: non graded.
The course will consist of an introduction to the various software programs used in the electrical technology program. Students will develop all the components of a complete engineering technical report. The course will utilize computer applications to research and complete technical reports and documentation. Included are Computer Aided Design Software, Word, Excel, Visio, Constructor, and web-based communication and information research.

ELECT 602 0 units
Electrical Mathematics
54 hours lecture
Corequisite: ELECT 600.
Grading: non graded.
This course is designed for students enrolled in the Electrical Technology Program or Industry professionals coming back to complete continuing education units. This course covers the learning and application of mathematics and pre-algebra needed in the electrical industry. Faculty will utilize guided learning activities to help students to take meaningful measurements and apply mathematics and electrical formulas to solve problems. Students will learn how to apply topics such as arithmetic, fractions, decimals, percentages, graphing, measurement, and pre-algebra to better understand how to solve electrical formulas.

ELECT 619B 0 units
FCC Amateur Radio Technician Lic. Prep.
36 hours lecture
Recommended Preparation: ELECT 630A.
Grading: non graded.
This course prepares students to take the FCC Technician License exam for Amateur Radio Operators. Students will learn all the elements contained in the licensing exam as well as participate in example exams. This class will cover the latest test banks as directed by the FCC. Students will learn through lecture topics, computer aided material and hands-on examples.

ELECT 620A 0 units
Electric Cable Termination IPC-620C
18 hours lecture, 54 hours laboratory
Grading: non graded.
This course is the first of two courses where students learn proper cable termination methods and practices while working under the industry standard IPC/WHMA-A-620. The IPC/WHMA-A-620 standard provides the electronics industry with the most current criteria for the performance and acceptance of cable and wire harness assemblies. Students are prepared for entry level jobs in the aerospace and industrial harness and wiring industries.

ELECT 620B 0 units
Electric Cable Inspection IPC-620C
18 hours lecture, 18 hours laboratory
Grading: non graded.
This course is the second of two courses where students learn cable harness and wire inspection methods per IPC/WHMA-A-620. Students will use their cable assemblies from ELECT 620A and are taught proper cable inspection methods and practices. The IPC/WHMA-A-620 provides the electronics industry with the most current criteria for the performance and acceptance of cable and wire harness assemblies. Students are prepared for entry level jobs in the aerospace and industrial harness and wiring industries.

ELECT 630A 0 units
Intro to Electronics
9 hours lecture, 18 hours laboratory
Grading: non graded.
This course provides hands-on experience covering basic electronics and electronic assembly. Electronic components are covered as well as soldering techniques and kit assembly. Students are introduced to schematic reading, basic circuit analysis as well. This class provides a pathway to additional classwork in electronics, RF communication and robotics.

ELECT 630B 0 units
Introductory Robotics Camp
9 hours lecture, 18 hours laboratory
Recommended Preparation: ELECT 630A.
Grading: non graded.
This course provides hands-on experience that will introduce students to the fundamentals of Industrial Robotics as well as Underwater Robotics. This is a hands-on class and students will learn how to program Omron Industrial Robots and how to pilot underwater robots.

ELECT 632A 0 units
Electrical Power Generation
18 hours lecture, 54 hours laboratory
Recommended Preparation: ELECT 602.
Grading: non graded.
This course provides hands-on experience covering the connection and operation of a power generation system, including electrical connections, control systems and documentation. This covers the electrical half of a diesel or CNG electric power generation system.

ELECT 632B 0 units
Power Generation Troubleshooting
18 hours lecture, 54 hours laboratory
Recommended Preparation: ELECT 632A.
Grading: non graded.
This course provides hands-on experience troubleshooting motor generator based power generator systems covering possible faults and operational problems and proper methods of troubleshooting and repair. Test procedures, service schedules and general maintenance are covered.