

# CLIMATE & ENERGY CONTROL (CEC)

## Courses

### CEC 105 Workplace Skills (1)

Upon successful completion of this course, the student should be able to identify the job skills necessary to have a successful career in the field of their choice. Topics included listening skills, oral communication, human relations, decision making/problem solving, how to work as a team, time and resource management, work ethics, career planning and resume building.

### CEC 110 Safety Orientation/OSHA 10 (1)

Safety Orientation/OSHA 10 provides the student with an overview of the OSHA standards relevant to the construction industry. Various topics are presented in a 15-hour format. Among the subjects covered in the course are: an introduction to OSHA, electrical safety, fall protection, and excavation and trenching safety.

### CEC 111 Introduction to HVACR (3)

In this course, students will receive an overview of the HVAC industry, learning about different career pathways, as well as hand tools, power tools and general construction safety.

### CEC 115 Electrical Fundamentals (4)

The student will receive instruction in basic electrical theory for DC and Alternating Current systems. The student will have knowledge on the production of electricity and how to apply Ohm's Law and Power Formula. Electrical safety is taught along with skills in how to read and interpret schematic diagrams. This class must be passed with a minimum of a C or 78% for the student to continue to next course.

### CEC 116 Electrical Fundamentals II (1)

Students will be introduced to motor theory and explore motor applications. This course builds on previous knowledge gained in Electrical Fundamentals I and requires a firm understanding of magnetism and voltage production. Motor trouble shooting will be introduced. Types of motors covered will be single phase motors, three phase and ECM motors. This class must be passed with a minimum of a C or 78% for the student to continue to next course.

### CEC 118 Electrical Fundamentals II (2)

Students will be introduced to motor theory and explore motor applications. This course builds on previous knowledge gained in Electrical Fundamentals I and requires a firm understanding of magnetism and voltage production. Motor trouble shooting will be introduced. Types of motors covered will be single phase motors, three phase and ECM motors. This class must be passed with a minimum of a C or 78% for the student to continue to next course.

### CEC 120 Heating System Fundamentals (4)

This course will give students a firm understanding of combustion and how it is applied in the HVAC trade. Residential gas furnaces will be studied in detail in order to gain understanding in how they are installed and serviced. A thorough understanding of Standard, Midrange and High Efficiency furnace service and installation will be earned as a result of this course. This class must be passed with a minimum of a C or 78% for the student to continue to next course.

### CEC 121 Heating System Fundamentals II (2)

The heating System Fundamentals II course is designed to walk student thorough the requirements of the Uniform Mechanical Code in relation to Gas Piping and exhaust ventilation. Student will gain a thorough understanding and be able to apply skills in sizing vents and pipe upon completion of this course.

### CEC 123 Adv Electrical Theory for HVAC (3)

Advanced Electrical Theory for HVAC is a continuation of Electrical Fundamentals and places an emphasis on developing systematic diagnosis and troubleshooting methods and procedures that will enable the student to become a highly-skilled, professional HVAC-R service technician.

### CEC 125 Adv Electrical Theory for HVAC (2)

Advanced Electrical Theory for HVAC is a continuation of Electrical Fundamentals and places an emphasis on developing systematic diagnosis and troubleshooting methods and procedures that will enable the student to become a highly-skilled, professional HVAC-R service technician.

### CEC 126 Advanced Heating Systems (3)

This course will introduce students to electric furnaces and hydronic heating with an emphasis on the electrical systems of those units and code requirements for the safe installation of such equipment. Indoor air quality will be discussed in detail as a major factor in human comfort.

### CEC 135 Sheet Metal Fabrication I (3)

This course focuses on sheet metal fabrication utilizing various sheet metal tools and techniques. Duct sizing is discussed in addition to code requirements for duct systems.

### CEC 202 Environmental HVAC Systems (4)

Environmental HVAC Systems introduces students to the heat transfer systems used in commercial applications to maintain comfort in a space. Students will gain an understanding of heat transfer, system design, commercial equipment and their operations. This course prepares students to enter into commercial work and exposes them to old and new designs they will encounter in the field while helping them understand the practices for energy efficiency in these systems.

### CEC 205 HVAC Fundamentals (5)

This course is designed to introduce students to the broader picture that is HVAC. Students will become familiar with trade related organizations, job requirements, gain skills in soldering and brazing, and demonstrate learned skills to service and repair air conditioning systems. Students must earn a C grade or better in this course in order to advance to the next course.

### CEC 207 Heating System Installation (3)

The heating System Fundamentals II course is designed to walk student thorough the requirements of the Uniform Mechanical Code in relation to Gas Piping and exhaust ventilation. Student will gain a thorough understanding and be able to apply skills in sizing vents and pipe upon completion of this course.

### CEC 210 EPA 608 (1)

Students will be certified in federal regulations of safe refrigerant handling practices. Successful completion of the certification course is required for technicians to work with and purchase refrigerants.

### CEC 212 HVAC Installation (3)

Students will learn installation practices according to manufacturers' recommendations and local code, including installing residential split systems, learning about heat pumps, indoor air quality (IAQ), and proper air flow. Prerequisites: Intro to HVACR, Electrical Fundamentals, Heating System Fundamentals, HVAC Fundamentals, EPA 608.

**CEC 214 HVAC Services & Diagnostics (3)**

Students will learn the different types of compressors used in cooling equipment, proper preventative maintenance practices, and how to diagnose refrigeration, combustion, and electrical faults commonly found in HVAC equipment. Prerequisites: Intro to HVACR, Electrical Fundamentals, Heating System Fundamentals, HVAC Fundamentals, EPA 608, HVAC Installation

**CEC 215 Intro Mechanical Refrigeration (6)**

The students will apply knowledge previously learned in HVAC Fundamentals to ice machines, refrigerators and commercial coolers. Students will learn the function of the specialized electrical circuits and how to service and repair these systems.

**CEC 225 Heat Pumps & VRF (6)**

In this course, students will learn about Heat Pumps and Variable Refrigerant flow (VRF) systems. They will gain an understanding of how these systems function, proper installation considerations, how to maintain and troubleshoot heat pump and VRF systems.

**CEC 230 Commercial HVAC Level I (6)**

This course will introduce students to the commercial applications of various HVAC systems. A strong foundation in refrigeration theory is required as well as a comprehensive understanding of system airflow and electrical fundamentals. Students who complete this course will be skilled in reading advanced electrical schematics and be able to describe the function and application of various commercial systems and components including Direct Digital Control systems and frequency drives.

**CEC 235 Commercial HVAC II (6)**

This course continues the introduction to Commercial HVAC systems. Students will perform basic maintenance, repairs and troubleshooting on functioning light commercial and commercial equipment. Students will also have the opportunity to participate in on-the-job training (OJT).