Architecture and Construction Career Cluster
Introduction to HVACR Systems
Course Number 47.41400

Course Description:
This course is preceded by the Industry Fundamentals and Occupational Safety course. The course offers an opportunity for students to build on the knowledge and skills developed in the Fundamentals course. Students will be introduced to two-construction craft areas. As the second step in gaining a Level One Industry Certification in one of two craft areas, the goal of the course is to introduce students to the basic building blocks of the HVACR and Low Voltage Electrical craft trades. Students will explore how the crafts affect the mechanical systems in a building and will learn and apply knowledge of the electrical, electronic, and mechanical components related to each trade. In addition, students will be introduced to, and develop skills to differentiate between tools used in each individual craft area.

Course Standard 1
AC-IHVACR-1
Demonstrate employability skills required by business and industry.
The following elements should be integrated throughout the content of this course.
1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.
1.2 Demonstrate creativity with multiple approaches to ask challenging questions resulting in innovative procedures, methods, and products.
1.3 Exhibit critical thinking and problem-solving skills to locate, analyze, and apply information in career planning and employment situations.
1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.
1.5 Apply the appropriate skill sets to be productive in a changing, technological, and diverse workplace to be able to work independently, interpret data, and apply teamwork skills.
1.6 Present a professional image through appearance, behavior, and language.

Course Standard 2
AC-IHVACR-2
Demonstrate a thorough understanding of electrical concepts, theories, laws, and simple circuits.
2.1 Explain atomic theory, Ohm's law, and Kirchoff's law in relation to electrical circuits.
2.2 Demonstrate a working knowledge of the math needed to calculate amperage, voltage, wattage, and resistance.
2.3 Distinguish between series, parallel, and series parallel circuits.
2.4 Demonstrate proper use of a multi meter and ammeter.

Course Standard 3
AC-IHVACR-3
Identify and describe electrical circuitry associated with the HVACR trade.
3.1 Recognize and describe the purpose and operation of the various electrical components used in HVACR equipment.
3.2 Identify different types of resistors and explain how their resistance values can be determined.
Course Standard 4

AC-IHVACR-4

Compare components to schematic symbols.

4.1 Compare components to the schematic symbol.
4.2 Read and interpret schematic diagrams.
4.3 Identify and explain the sequence of operation for a basic HVACR schematic diagram.

Course Standard 5

AC-IHVACR-5

Describe and illustrate alternating current.

5.1 Explain how alternating current is developed and draw a sine wave.
5.2 Describe the operation of types of single-phase transformers.
5.3 Describe the types and applications of capacitors.
5.4 Identify and describe applications of single-phase motors.

Course Standard 6

AC-IHVACR-6

Demonstrate the ability to test various electrical components in a HVAC system.

6.1 Explain how magnetism works in various electrical components in an HVAC system.
6.2 Demonstrate testing contactors, relays, transformers, bi-metal thermostats, electrical heating elements, capacitors, and solenoids.
6.3 Demonstrate checking a compressor electrically using resistance readings.
6.4 Demonstrate starting and running common terminals on a compressor.

Course Standard 7

AC-IHVACR-7

Demonstrate installing and troubleshooting thermostats.

7.1 Identify and explain the types and operation of thermostats.
7.2 Identify and explain the low voltage side of the HVAC system.
7.3 Demonstrate correct thermostat installation procedures.
7.4 Explain and demonstrate troubleshooting procedures on the low voltage side of the HVAC system.

Course Standard 8

AC-IHVACR-8

Examine how SkillsUSA is a co-curricular part of career and technical education through leadership development, school and community service projects, and competitive events.

8.1 Explain the purpose, mission, objectives, motto, colors, official dress and other distinguishing characteristics of SkillsUSA.
8.2 Explain how participation in SkillsUSA can promote lifelong responsibility for community service, professional growth and development.
8.3 Explore the impact and opportunities that SkillsUSA can develop to bring business and industry together with education in a positive working relationship through innovative leadership and career development programs.
8.4 Explore the local, state, and national opportunities available to students through participation in SkillsUSA, including but not limited to conferences, competitions, community service, philanthropy, and other SkillsUSA activities.