

Lewis & Clark Career Center
Heating, Ventilation, Air Conditioning & Refrigeration
(HVACR)
Course Syllabus

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Course Description: This class is designed to provide occupational and technical information related to the HVAC industry. It is a 2 year program, heating and air conditioning covered in separate years on rotation. Basic skills taught in this class are safety, tool identification and functions, refrigeration principles and practices, piping principles and practices, basic electricity, electric motors, controls, preventive maintenance, basic knowledge & skills in troubleshooting, installation and service of residential and light commercial forced air systems, basic sheet metal fabrication & installation and customer relations.

Program goal: All students will have a positive placement. Each student will complete the program prepared to advance to an entry-level position in the HVAC industry, enlist with the military, or attend a college or technical school.

Textbook:

Modern Refrigeration and Air Conditioning, Althouse/Turnquist/Bracciano. Publisher G-W 2021

Grading System:

Categories:

- 35% Employability
- 35% Hands on Shop/Lab
- 30% Classroom work/test

Classroom expectations & Shop rules:

Class expectations:

- Be in your seat before the bell rings.
- All noise is to stop at the bell.
- No talking to others when the lecture is going on.
- Raise hand for recognition-stay on subject matter.
- Stay alert (awake) in class.
- Be prepared for class-books, pencil, pen and tools.
- Sit up in your seat.
- If you need to leave the class, inform the instructor.
- No cell phones are to be on during the time you are at L&C.
- No vulgar language.
- No food or drink in the shop.
- No sunflower seeds.

Shop rules:

- Safety glasses must be worn in the shop and work areas.
- Keep noise to a minimum-no yelling, shouting, or cutting up.
- No horseplay.
- No visiting-stay in your work area.
- No open toe shoes, shorts or torn clothing to be worn in the shop.
- If it is not yours do not touch it.

Students learn good work habits by performing daily tasks on furnaces and air conditioners. Students are expected to learn how to become a professional in the HVAC field, and practice this trait while learning their profession. Absent work, Make-up work, Late Work, Technology Expectations, Classroom/Shop Expectations, Dress Code, Damaged Textbook or Equipment etc, are in the student handbook.

STUDENT YOUTH ORGANIZATIONS:

Skills/USA is the youth organization designed to develop the student's leadership abilities, in addition to his/her particular skill or trade, which will aid him/her in becoming a successful employee. It is also designed to create a common bond among all students. The Skills/USA organization is used to help the student learn about their community and the HVAC field.

ESSENTIAL SKILLS:

Air Conditioning Year:

- Safety and basic refrigeration safety as it pertains to air conditioning.
- HVAC tools and their use
- Perform copper tubing operations, including cutting, flaring, soldering, brazing, bending and swaging.
- Fabricate sheet metal fittings.
- Perform gas pipe operations (cutting, reaming, threading and connecting.)
- Read and interpret voltage, ampere and ohms with a meter.
- Cover electrical power and control circuits.
- Recognize the application of various types of capacitors. Test capacitors.
- Interpret electric motor specifications (horse power, voltage, etc.)
- Install electric motors.
- Cover principles of refrigeration.
- Explain heat transfer theory.
- Use gauge manifold set.
- Perform preventive maintenance on air conditioning system.
- Leak-test system
- Evacuate and measure vacuum level to 500 microns.
- Pump down refrigeration/ac unit.
- Recover refrigerants.
- Charge system to manufacturer's specifications.
- Describe the operation of refrigeration system accessories (receivers, accumulators, filter/dryers, sight glasses, valves, etc.)
- Troubleshooting the air conditioning system.

Heating year:

- Safety
- HVAC tools and their use.
- Perform gas pipe operations (cutting, reaming, threading and connecting.)
- Fabricate sheet metal fittings.
- Perform copper tubing operations, including cutting, flaring, soldering, brazing, bending and swaging.
- Read and interpret voltage, ampere and ohms with a meter.
- Install electrical power and control circuits.
- Recognize the application of various types of capacitors. Test capacitors.
- Interpret electric motor specifications (horse power, voltage, etc.) Install electric motors.
- Perform preventive maintenance on heating systems.
- Start and check residential heating system
- Troubleshoot gas fired heating system.

- Install and replace PVC pipe.
- Install/replace transformer.
- Troubleshooting electric heating system.
- Explain principles of refrigeration.
- Explain heat transfer theory.
- Use gauge manifold set.
- Leak-test system
- Evacuate and measure vacuum level to 500 microns.
- Recover refrigerants.
- Charge system to manufacturer's specifications.
- Describe the operation of refrigeration system accessories (receivers, accumulators, filter/dryers, sight glasses, valves, etc..)
- Troubleshoot heat pumps.

Student Signature:

Date:

Parent Signature:

Date: