

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Heating System Fundamentals
COURSE NUMBER	HVAC 0120
DIVISION	Career and Technical Education
DEPARTMENT	HVAC
CIP CODE	47.0201
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 1 Lab: 4
PREREQUISITES	None

COURSE DESCRIPTION

This course will cover the fundamentals of gas residential heating and indoor air quality. Each system will be studied and discuss as to efficiency, relative purchase cost, installation cost, operating cost, and troubleshooting problems.

PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:
https://kansasregents.org/workforce_development/program-alignment

PROGRAM LEARNING OUTCOMES

1. The student will be able to demonstrate the ability to perform HVAC procedures in a safe manner
2. The student will be able to classify the different needs of equipment and summarize a solution.
3. The student will be able to exhibit a high level of professionalism including appropriate dress, attendance, communication skills and other soft skills necessary.

TEXTBOOKS

<http://kckccbookstore.com/>

METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE

- I. Gas Heating
 - A. Introduction to Gas Fired Forced Hot Air Furnaces
 - 1. Apply math to daily applications
- II. Maintenance and repairs of various HVAC systems
 - A. Troubleshooting heating systems
 - B. Troubleshooting cooling systems
 - C. Troubleshooting heat pumps systems
- III. Gas piping
 - A. Threading of pipe
 - B. Ferrous metal pipes

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Demonstrate how to diagnose heating equipment.
 - 1. Demonstrate how to list the sequence of operation.
 - 2. Demonstrate how to assess air flow/water flow.
 - 3. Demonstrate how to measure temperature split.
 - 4. Demonstrate how to check and adjust thermostat heat anticipators.
 - 5. Demonstrate how to perform start up procedures.
 - 6. Introduce troubleshooting of heating, cooling, and heat pump systems.
 - 7. Introduce troubleshooting of control circuits, electronic controls, and accessories.
 - 8. Introduce troubleshooting of air quality and energy conservation equipment.
- B. Demonstrate the maintenance and repairs of various HVAC systems.
 - 9. Demonstrate how to check gas pressures.
 - 10. Inspect and perform standard seasonal maintenance and tune-up.
 - 11. Introduce airside and hydronic systems including various types of boilers, piping, chilled-water systems and their components.
 - 12. Demonstrate how to take measurement and control of air temperature, humidity, pressure, and velocity.
 - 13. Demonstrate the maintenance and repairs of various HVAC systems.
- C. Explain heating system design and functions.
 - 14. Recognize different fuel types used in various furnaces.
 - 15. Identify different efficiency of furnaces.
 - 16. Identify carbon monoxide safety violations.
 - 17. Demonstrate how to apply trade math to daily applications.
 - 18. Interpret mechanical drawings, symbols, and their applications.
 - 19. Demonstrate how to design and install venting for fossil fuel appliances.
 - 20. Explain heating system design and functions.

- D. Demonstrate proper gas piping techniques.
21. Identify the types of ferrous metal pipes.
 22. Demonstrate how to measure the sizes of ferrous metal pipes.
 23. Identify the common malleable iron fittings.
 24. Demonstrate how to cut, ream, and thread ferrous metal pipe.
 25. Demonstrate how to join lengths of threaded pipe together and install fittings.
 26. Describe the main points to consider when installing pipe runs.
 27. Describe the methods used to join piping.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.