

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	HVAC Fundamentals
COURSE NUMBER	HVAC 0115
DIVISION	Career and Technical Education
DEPARTMENT	HVAC
CIP CODE	47.0201
CREDIT HOURS	4
CONTACT HOURS/WEEK	Class: 1.5 Lab: 5
PREREQUISITES	None

COURSE DESCRIPTION

This course will cover the history of refrigeration and air condition, also an introduction to tools and safety procedures. This will include tubing identification, cutting procedures for copper tubing, tub bending, soldering, brazing, swaged joints, threading steel pipe and proper procedures for plastic pipe.

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. Career and opportunities in HVAC/R
 - A. Residential HVAC/R
 - B. Commercial HVAC/R
- II. Regulatory Codes
- III. Schedules and Drawings
- IV. Purpose of Refrigerant Piping
 - A. Tube cutter
 - B. Cutting tubing
 - 1. Alignment
 - 2. Turning
- V. Plastic Pipe
 - A. ABS
 - B. PVC
 - C. CPVC
 - D. Schedule 40
- VI. Practical Soldering and Brazing Tips
 - A. Low temperature
 - B. High temperature
 - C. Different joints
 - 1. Copper to steel
 - 2. Copper to brass
 - 3. Copper liquid line to a steel filter drier
 - 4. Larger copper suction line connection
 - 5. Copper heating
- VII. Heat Transfer
- VIII. HVAC system Installation
- IX. Identify Major Components Safety procedures
 - A. Handling major components
 - B. Removal of major components
- X. Refrigerant Recovery Process
 - A. Refrigerant Leakage
 - B. Pressure and Temperature measuring instruments
- XI. Math principles
- XII. Refrigerant oils

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Identify career and apprentice opportunities in the HVAC trade.
 - 1. Identify career and apprentice opportunities in the HVAC trade

- B. Describe regulatory codes encountered in HVAC trade.
 - 2. Describe the types of regulatory codes encountered in the HVAC trade.
- C. Identify schedules and drawings used in HVAC trade
 - 3. Identify the types of schedules/drawings used in the HVAC trade.
- D. Demonstrate the purpose of installing refrigerant piping.
 - 4. State the precautions that must be taken when installing refrigerant piping
 - 5. Demonstrate how to select the right tubing for a job.
 - 6. Demonstrate how to cut and bend copper tubing.
 - 7. Demonstrate how to safely join tubing by using flare and compression fittings.
 - 8. Demonstrate how to determine the kinds of hangers and supports needed for refrigerant piping.
 - 9. State the basic safety requirements for pressure-testing a system.
- E. Identify types of plastic pipe used in HVAC applications.
 - 10. Identify types of plastic pipe and state their uses.
 - 11. Demonstrate how to cut and join lengths of plastic pipe.
- F. Demonstrate the techniques of practical soldering and brazing tips.
 - 12. Demonstrate soldering and brazing techniques.
- G. Demonstrate how heat transfer is the bases of air condition.
 - 13. Explain how heat transfer principles occur in a cooling system, demonstrating an understanding of the terms and concepts used in the refrigeration cycle.
 - 14. Demonstrate how to calculate the temperature and pressure relationships at key points in the refrigeration cycle.
 - 15. Demonstrate the use of temperature-and pressure-measuring instruments to make readings at key points in the refrigeration cycle.
 - 16. Identify commonly used refrigerants and demonstrate the proper procedures for handling these refrigerants.
 - 17. Identify the major components of a cooling system and explain how each type works.
 - 18. Identify the major accessories available for cooling systems and explain how each works.
 - 19. Identify the control devices used in cooling systems and explain how each works.
- H. Demonstrate the installation of a HVAC systems.
 - 20. Install one or more of the following HVAC systems and their components: (1) Residential, (2) Commercial, and /or (3) Industrial.
- I. Identify the safety procedures of handling and removal of major components.

21. Identify the proper safety procedures of handling and removal of major components.

J. Demonstrate the refrigerant recovery process

22. Demonstrate refrigerant leak detection procedures.

23. Demonstrate refrigerant evacuation procedures.

24. Demonstrate refrigerant recovery procedures.

25. Demonstrate refrigerant charging procedures.

26. Demonstrate refrigerant recycle procedures.

K. Demonstrate math principles

27. Demonstrate how to apply trade math principles.

L. Identify different refrigerant oils

28. Identify the difference between refrigerant oils.

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>.