COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	R-410A Safety Certification (Green Technology)
COURSE NUMBER	HVAC 0221
DIVISION	Career and Technical Education
DEPARTMENT	HVAC
CIP CODE	47.0201
CREDIT HOURS	1
CONTACT HOURS/WEEK	Class: 1 Lab:
PREREQUISITES	HVAC 0220

COURSE DESCRIPTION
This course is written on the belief that the solution to transition to environmentally safer refrigerants and oils, while keeping the public and technicians out of harms way, is education and training. This certification program was written to assist in the training and certification of HVACR technicians for proper safety, handling and application of R-410A refrigerant.

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. Introduction to the R-410A and the R-22 Phase-Out
   A. Background
   B. HCFC Phase-out Schedule
   C. Regulation and Change
   D. Safety and R-410A
II. Introduction to Refrigeration and Air Conditioning Systems Fundamentals
   A. Vapor Compression Refrigeration System
   B. Condensing Pressure
   C. Evaporating Pressure
   D. Refrigerant States and Conditions
III. The study of Refrigerant Chemistry and Applications
   A. CFC's HCFC's and HFC's
   B. Blends
   C. Blend Temperature Glide
IV. The use of Refrigeration Oils and Their Applications
   A. Oil Groups
   B. Synthetic Oils
   C. Alkylbenzene
   D. Glycols
   E. Esters
   F. Waste Oils
V. The application of Safety
   A. Personal Safety Protection
   B. Electrical Safet5y
   C. Safe Refrigerant Handling
   D. Storage Cylinders

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

A. Describe the condensing and evaporating pressure.
   1. Describe why the condensing pressure is higher than the evaporating pressure.

B. Explain the liquid and vapor states of refrigerants.
   2. Explain liquid refrigerant in the condensing side of the system.
   3. Explain vapor refrigerant in the evaporator side of the system.

C. Describe a superheated vapor and a subcooled liquid.
   4. Describe superheated vapor as heat added past the saturation point.

5. Describe subcooled liquid as liquid refrigerant cooled below the condensing point.

D. List the components of the basic vapor compression system.
   6. List the components of the basic vapor compression system: Compressor, Evaporator, Condenser, Metering Device.
   7. The student will demonstrate application of all applicable components of EPA Section 608 for fixed equipment.

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.