REFRIGERANTS AND LUBRICANTS
Course Syllabus

Course Number: ARCO-0148
OHLAP Credit: No
OCAS Code: None
Course Length: 15 Hours
Career Cluster: Architecture & Construction
Career Pathway: Maintenance/Operations
Career Major(s): HVAC Technician

Pre-requisite(s):

Course Description: This course covers the properties and applications of the many refrigerants used in refrigeration and air conditioning applications. Refrigeration lubricants, their properties and applications, including compatibility issues with various refrigerants, principles of safe handling for refrigerants and lubricants will be important components of this course.

Textbooks:


Refrigeration & Air Conditioning Technology, 7th Ed, (2013), Whitman /Johnson/ Tomczyk Silberstein / Publisher Delmar Cengage


Course Objectives:

A. Become Familiar with Refrigerants.
1. Explain the different classes of refrigerants:
   a. CFC Refrigerants
   b. HCFC Refrigerants
   c. HFC Refrigerants
   d. HC Refrigerants
   e. Other Refrigerants
   f. Azeotropic mixtures (ASHRAE 500 series)
   g. Zeotropic blends (ASHRAE 400 series)
2. Explain physical and chemical properties:
   a. Flammability and toxicity
   b. Materials compatibility
   c. Miscibility and oil return
   d. Pressure and temperature data
   e. Refrigerant temperature glide
   f. Environmental properties (ODP, GWP and TEWI)
   g. Bubble point
   h. Dew point
3. Define pure refrigerants and azeotropic mixtures
4. Define zeotropic mixtures
5. Define zeotropic blends
6. Identify the color and classification of refrigerants by Pantone Matching System (PMS) color number.¹
7. Explain fractionization of blends.¹
8. Look up saturation pressure and temperature:¹
   a. Single element refrigerant¹
   b. Azeotropic¹
   c. Zeotropic¹
   d. Blends¹
9. Identify when saturation pressure and temperature do not match the refrigerant.¹
10. Calculate superheat and subcooling.¹
11. Calculate superheat and subcooling glide.¹

B. Understand Lubricants.
   1. Explain the function of lubricants in systems.¹
   2. Explain the different types and applications of lubricants:¹
      a. Alkylbenzenes (AB)¹
      b. Mineral oils¹
      c. Polyolesters (POE)¹
      d. Polyglycols (PAG)¹
   3. Explain properties of lubricants:¹
      a. Materials compatibility¹
      b. Miscibility and oil return¹
      c. Pour point and flash point¹
      d. Viscosity¹
      e. Water absorption¹
      f. Rust and oxidation inhibitors¹
   4. Describe proper oil disposal.¹
   5. Draw oil sample from system.¹
   6. Demonstrate proper handling of POE's.¹
   7. Use acid test kit for mineral oil and AB.¹
   8. Demonstrate proper use of a refractometer or oil sample test.¹

¹ ODCTE objective

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.
Available Certifications/College Credit

The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility:

The student must maintain a grade point average of 2.0 or better.