

# FENG 140 : Commercial Refrigeration and Air Conditioning Diagnostics

**Credits:** 3

**Class Hours:** 2 lecture and 2 lecture/lab

**Prerequisites:** "C" or higher in FENG 130.

**Description:** This course builds on the skills acquired in the FENG 130, Basic Fundamentals of Air Conditioning and Refrigeration, course. This develops practical skills for technicians, air conditioning and refrigeration helpers, and an introduction to mechanical engineering. This course covers the performance evaluation on working systems under various conditions along with developing refrigerant diagnostic skills. EPA Recovery Certification is required.

**Semester Offered:** Spring

**Course Student Learning Outcomes (CSLOs):**

1. Demonstrate an understanding of the terms related to the various systems, including identifying the states of refrigerant at various points in the system, calculating and verifying the performance of a basic system on paper and during actual operation.
2. Demonstrate the proper safety procedures involved in working with refrigerants including the ability to select classifications of accidents in the refrigeration shop, complete specific safety rules which apply to the trade, identify electrical safety problems and find specific solutions, and understand proper labeling and tags.
3. Demonstrate the ability to determine the normal operating conditions of air conditioning and refrigeration equipment using temperature differences of the condensers and evaporators, humidity and wet bulb characteristic of evaporators, and superheat and subcooling measurements.
4. Demonstrate the system diagnostic techniques for overcharged and undercharged systems, including restrictions in tubing, filters, metering devices, air flow restrictions and their effects on system performance using calculated data, lab data, and computer simulations.
5. Demonstrate the use of proper techniques and equipment to perform refrigerant evacuation, recovery, and charging techniques and the use of specific equipment to perform these operations.
6. Identify common accessories and their location, and distinguish between types of service valves.