



8997

APPLIED REFRIGERATION AND
AIR CONDITIONING (9)

40S / 40E / 40M

A Refrigeration and Air Conditioning Technology
Course

8997

APPLIED REFRIGERATION AND AIR CONDITIONING
(12D)

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Course Description

A student wanting to expand skills in the refrigeration and air conditioning industry must be able to apply diagnostic strategies to a variety of refrigeration, heating, and air conditioning components. The students will demonstrate the ability to diagnose and correct basic maintenance procedures on heating, cooling, and refrigeration equipment with some supervision or direction. This may include job shadowing and work with outside contractors in the HVAC/R industry.

Goal 1: Describe and apply appropriate **health and safety practices** as they relate to the **maintenance of a safe workspace**.

GLO 1.1: Create and maintain a **safe working environment** in machining technology.

- SLO 12D.1.1.1 Demonstrate awareness of the principles of workplace hazards surrounding refrigeration and air cooling environments.
- SLO 12D.1.1.2 Demonstrate awareness of the principles of Workplace Hazardous Materials Information Systems (WHMIS) as they apply to the refrigeration and air conditioning service and repair industry. (A3.11)
- SLO 12D.1.1.3 Describe the purpose of Material Safety Data Sheets (MSDS).
- SLO 12D.1.1.4 Describe workplace health and safety procedures (e.g., S.A.F.E., right to refuse). (A3.11)
- SLO 12D.1.1.5 Follow safety information on supplier labels.
- SLO 12D.1.1.6 Identify the process for reporting injuries.
- SLO 12D.1.1.7 Identify ergonomically correct procedures to avoid injury (e.g., stress, strain). (A3.7)
- SLO 12D.1.1.8 Identify fire prevention and control strategies.
- SLO 12D.1.1.9 Identify emergency evacuation and response procedures.

GLO 1.2: Create and maintain a **safe working environment**.

- SLO 12D.1.2.1 Identify hazards and precautions working with and around all types of energized equipment.
- SLO 12D.1.2.2 Identify hazards and precautions working with and around energized equipment. (A12.2)
- SLO 12D.1.2.3 Identify and report hazards (e.g., electrical safety, ergonomics, material handling, and chemical) related to processes, materials, tools, and equipment used in the refrigeration and air conditioning shop.
- SLO 12D.1.2.4 Follow the directions of the teacher/supervisor in regards to safe work practices.
- SLO 12D.1.2.5 Follow safe practices and procedures for facilities, processes, materials, tools, and equipment used in the refrigeration and air conditioning shop (e.g., equipment used in the refrigeration and air conditioning shop (e.g., keep work area clean and organized, avoid horseplay). keep work area clean and organized, avoid horseplay).
- SLO 12D.1.2.6 Describe and use appropriate personal protective equipment. (e.g., gloves, safety glasses or goggles, hearing protection, respirator mask, etc.). (A3.2)
- SLO 12D.1.2.7 Locate first aid and eyewash station.
- SLO 12D.1.2.8 Identify and report hazards (e.g., electrical, ergonomic, material handling, chemicals, and spills) related to materials, processes, tools and equipment used in the refrigeration and air conditioning facility.

Goal 2: Demonstrate the safe and appropriate **selection, operation, and management** of shop **equipment and tools**.

GLO 2.1: Demonstrate the safe and appropriate **selection, operation, and management** of shop **equipment and tools**.

- SLO 12D.2.1.1 Select, operate, and manage equipment and tools used in refrigeration and air conditioning.

Goal 3: Demonstrate the safe and appropriate selection and utilization of **materials**.

GLO 3.1 Demonstrate the safe and proper appropriate selection and utilization of **fasteners and supports**.

- SLO 12D.3.1.1 Select and utilize fasteners and supports.

GLO 3.2 Demonstrate the safe and proper manipulation of **pipng and tubing.**

SLO 12D.3.2.1 Select, set up, modify, and manipulate piping and tubing systems.

GLO 3.3 Demonstrate the safe and appropriate manipulation of **sheet metal.**

SLO 12D.3.3.1 Demonstrate the safe and appropriate manipulation of sheet metal.

Goal 4: Install heating, cooling, and refrigeration equipment.

GLO 4.1 Demonstrate an awareness of the **installation requirements** for heating, cooling, and refrigeration equipment.

SLO 12D.4.1.1 Determine the installation requirements for heating, cooling, and refrigeration equipment.

GLO 4.2 Demonstrate the appropriate installation of heating, cooling, and refrigeration equipment.

SLO 12D.4.2.1 Install heating, cooling, and refrigeration equipment.

GLO 4.3: Test and document refrigeration and air conditioning systems.

SLO 12D.4.3.1 Test HVAC/R systems.

SLO 12D.4.3.2 Document HVAC/R systems.

Goal 5: Diagnose and repair heating, cooling, and refrigeration equipment.

GLO 5.1: Diagnose problems in heating, cooling, and refrigeration equipment.

SLO 12D.5.1.1 Diagnose problems in HVAC/R equipment.

GLO 5.2: Repair heating, cooling, and refrigeration equipment.

SLO 12D.5.2.1 Perform repairs to heating, cooling, and refrigeration equipment and systems.

Goal 6: Service heating, cooling, and refrigeration equipment.

GLO 6.1: Demonstrate awareness of the **servicing needs** of heating, cooling, and refrigeration equipment.

SLO 12D.6.1.1 Identify service and maintenance required for refrigeration and air conditioning systems.

GLO 6.2: Demonstrate the appropriate **servicing** of heating, cooling, and refrigeration equipment.

SLO 12D.6.2.1 Perform service and testing on refrigeration and air conditioning systems.

Goal 7: Describe and demonstrate the transferable **cross-curricular** knowledge and skills as they pertain to the refrigeration and air conditioning service and repair industry.

GLO 7.1: Demonstrate skills from **information and communication technology**.

SLO 12D.7.1.1 Research appropriate system selection for specific installation requirements, and make necessary calculations.

SLO 12D.7.1.2 Locate and utilize online installation guides and servicing information.

GLO 7.2: Read, interpret, and communicate information relevant to the refrigeration and air conditioning service and repair industry.

SLO 12D.7.2.1 Apply use of manuals to the commission, repair, and maintenance of refrigeration and air conditioning systems.

GLO 7.3: Apply the knowledge and skills related to the refrigeration and air conditioning service and repair industry from **mathematics**.

No applicable SLO.

GLO 7.4: Apply knowledge and skills from the sciences to the refrigeration and air conditioning service and repair industry.

No applicable SLO.

Goal 8: Demonstrate awareness of **sustainability** as it pertains to the refrigeration and air conditioning service and repair industry.

GLO 8.1: Describe the impact of human **sustainability** on the health and well-being of refrigeration and air conditioning mechanics and their clients.

SLO 12A.8.1.1 Discuss the long-term health and human sustainability concerns for refrigeration and air conditioning technicians.

SLO 12D.8.1.2 Discuss the contribution of refrigeration and air conditioning to human health and well-being.

GLO 8.2: Describe the refrigeration and air conditioning industry's **sustainability practices and impact on the environment.**

SLO 12D.8.2.1 Discuss the need to recover refrigerants to prevent their release into the environment.

GLO 8.3: Describe **sustainable business practices** within the refrigeration and air conditioning service and repair industry.

SLO 12D.8.3.1 Discuss how refrigeration and air conditioning businesses can adapt to a changing economy and changing demographics.

Goal 9: Demonstrate awareness of the **ethical and legal standards** as they pertain to the refrigeration and air conditioning service and repair industry.

GLO 9.1: Practice the **ethical and legal standards** as they pertain to the refrigeration and air conditioning service and repair industry.

SLO 12D.9.1.1 Demonstrate an understanding of codes and regulations related to refrigeration and air conditioning.

SLO 12D.9.1.2 Demonstrate an awareness of liability concerns related to HVAC/R systems and service.

Goal 10: Demonstrate **employability skills** related to the refrigeration and air conditioning service and repair industry.

GLO 10.1: Demonstrate fundamental **employability skills.**

SLO 12D.10.1.1 Demonstrate critical-thinking and problem-solving skills.

SLO 12D.10.1.2 Demonstrate regular attendance and punctuality.

- SLO 12D.10.1.3 Demonstrate accountability by taking responsibility for their actions.
- SLO 12D.10.1.4 Demonstrate adaptability, initiative, and effort.
- SLO 12D.10.1.5 Demonstrate the ability to accept and follow direction and feedback.
- SLO 12D.10.1.6 Demonstrate the ability to stay on task and to use time in class and in the shop effectively.
- SLO 12D.10.1.7 Demonstrate the ability to communicate respectfully with co-workers and customers.

GLO 10.2: Demonstrate an understanding of the **business operation** of a refrigeration and air conditioning service and repair shop.

- SLO 12D.10.2.1 Demonstrate awareness of the business operation of an HVAC facility.

Goal 11: Understand **career opportunities** in the refrigeration and air conditioning service and repair industry and associated professions.

GLO 11.1: Describe **education and career opportunities** and **professional organizations** in the refrigeration and air conditioning service and repair industry and associated professions.

- SLO 12D.11.1.1 Discuss the opportunities for employment in the refrigeration and air conditioning industry.
- SLO 12D.11.1.2 Create a portfolio showcasing the student's accomplishments in refrigeration and air conditioning.
- SLO 12D.11.1.3 Create a cover letter and resumé for the purpose of gaining employment in refrigeration and air conditioning.

Goal 12: Understand the **evolution, technological progression, and emerging trends** in the refrigeration and air conditioning service and repair industry.

GLO 12.1: Describe the **evolution, technological progression, and emerging trends** in the refrigeration and air conditioning service and repair industry.

- SLO 12D.12.1.1 Discuss the evolution, technological progression, and emerging trends in refrigeration and air conditioning, and how these pertain to the work done in an HVAC/R facility.

