Lesson 1 - Compressors
Objectives:
- Distinguish the different types of compressors.
- List the advantages and disadvantages of open-type, semi-hermetic, rotary, screw, and centrifugal compressors.
- Describe the basic functions performed by each type of compressor.
- Define compressor efficiency.
- Explain the effects of high suction and discharge pressure.

Lesson 2 - Open-Type Compressors
Objectives:
- Explain the difference between an open-type compressor and a hermetic compressor.
- Explain how the same compressor can be used for different temperature applications.
- Describe the steps necessary to service the electric motor on an open-type compressor in the field.
- Explain the effect of suction pressure on motor load.
- Describe the installation procedure for a direct-drive-open-type compressor.
- Determine by calculation the motor pulley diameter when the compressor flywheel diameter, the compressor speed, and the motor speed are given.

Lesson 3 - Hermetic and Semi-Hermetic Compressors
Objectives:
- List the five types of compressors used in the mechanical refrigeration system.
- Describe the basic operation of the five types of compressors.
- List the advantages of a hermetically sealed compressor over an open-type compressor.
- Explain the methods used to remove heat from the motors of hermetic and semi-hermetic compressors.
- Describe the procedures involved in replacing a hermetic or semi-hermetic compressor.
- Identify some of the factors that affect compressor capacity.

Lesson 4 - Refrigeration System Accessories
Objectives:
- Describe the operation, selection, and application of the following accessories:
  - condensing water regulators
  - check valves
  - safety relief devices
  - discharge oil separators
  - liquid level indicators and moisture indicators
  - discharge mufflers
  - compressor lubrication protection controls
  - strainers and filters
  - vibration eliminators
  - suction-line accumulators
  - heat exchangers
  - receivers
Lesson 5 - Desiccants and Driers
Objectives:
- State the purpose of a desiccant.
- Name and explain the ways in which a desiccant works.
- List three common desiccants used today.
- Describe the properties required of a desiccant.
- Define the terms mixed desiccants and solid-core desiccants.
- Identify the locations in which a drier can be installed, and explain the advantages and disadvantages of each.
- Describe the differences between a drier and suction-line filter.
- Explain what is meant by term hydrophobic behavior of desiccants.
- State the principle on which all moisture indicators work.

Lesson 6 - Air-Cooled Condensers
Objectives:
- Explain the function of an air-cooled condenser.
- Describe the effect of non-condensable gasses.
- Identify various types of air-cooled condensers.
- Determine where the condenser should be located.
- Explain the refrigerant piping arrangement for a remote air-cooled condenser.

Lesson 7 - Water-Cooled Condensers
Objectives:
- Describe the function of a shell-and-tube water-cooled condenser.
- Calculate condenser capacity.
- Explain how a tube-in tube condenser works.
- List the pros and cons of using a water-cooled condenser.
- Describe the operation of a shell-and-coil water-cooled condenser.

Lesson 8 - Evaporative Condensers and Cooling Towers
Objectives:
- Determine which condensing method should be used for applications in which plenty of cool water is available.
- Explain how an evaporative condenser works.
- Identify the factors that must be considered when you install an evaporative condenser.
- Describe the operational characteristics of an evaporative condenser water pump.
- Explain how a cooling tower operates.

Lesson 9 - Water Treatment (Part 1)
Objectives:
- Determine why water treatment is necessary.
- Identify the basic causes of corrosion.
- Define pH.
- Explain galvanic action.
- Discuss the importance of condensing temperature.
- Describe procedures for the field testing of water.
- List safety precautions for using scale removers.
- Describe cleaning procedures.

**Lesson 10 - Water Treatment (Part 2)**

Objectives:
- Explain why preventive maintenance is necessary for condensers and cooling towers.
- Add different types of algaecides to water-cooled equipment.
- Discuss the methods of scale prevention.

**Lesson 11 - Closed-Circuit Water Coolers**

Objectives:
- Explain the difference between a closed-circuit water cooler and an evaporative condenser.
- Discuss the factors that should be considered in selecting a closed-circuit water cooler.
- Describe how to regulate the capacity of a closed-circuit water cooler.
- Determine the location of louvers in a cold-climate application.
- Define the terms cooling range, approach, and temperature difference.

**Lesson 12 - Air-Cooled Condensing Unit Room Requirements**

Objectives:
- Explain why the majority of supermarkets use air-cooled condensing units.
- Describe the basis on which wall opening area is calculated for intake air in the condensing unit room.
- Determine factors governing the unit room planning.

**Lesson 13 - Heat Transfer Coils**

Objectives:
- Describe the design characteristics that apply to heating and cooling coils.
- Identify problems that cause improper performance of coils.
- Discuss important features to be considered in the selection of piping coils.

**Lesson 14 - Multiple Rack Systems**

Objectives:
- Explain the operation principles of multiple rack refrigeration systems.
- Describe the various components of one rack refrigeration system in particular (the Hussmann SUPERPLUS, shown below)--and by extension, of rack refrigeration systems in general.