



## FUNDAMENTALS OF AUTOMOTIVE AIR CONDITIONING

### Course Length

2.5 hours – 5.0 hours

### Course Description

This course introduces and familiarizes learners to the basics of automotive air conditioning systems. Users will learn the theory behind automotive A/C operation, the components in an automotive A/C system and their functions, various control mechanisms, and different types of A/C systems. Users will also learn about the air distribution system that performs the function of routing air through the system for heating, ventilating, and air conditioning

### Course Topics

#### ***Introduction to Air Conditioning***

- ◆ Function of air conditioning
- ◆ Principles of heat energy and thermodynamics
- ◆ Relative humidity
- ◆ Relationship between temperature and pressure

#### ***Refrigeration and Refrigerants***

- ◆ Concept of refrigeration
- ◆ HVAC system
- ◆ Heat transfer in an A/C system
- ◆ Different types of refrigerants and their properties

#### ***Automotive A/C Components and Controls***

- ◆ Basic components of automotive A/C - compressor, condenser, evaporator, thermal expansion valve or orifice tube, and hoses
- ◆ Various automotive A/C controls: blower speed controls, compressor cycling controls, and temperature controls

#### ***A/C Systems and Operation***

- ◆ Expansion valve systems
- ◆ Orifice tube systems
- ◆ CCTXV designs, CCOT designs, and CCTXV dual designs

#### ***Air Distribution System***

- ◆ Components of the HVAC system
- ◆ Air door designs and configurations
- ◆ Air distribution control mechanisms

### Course Objectives

#### ***In this course, users will learn to:***

- ◆ Describe the function of automotive air conditioning
- ◆ Recognize the principles of heat energy and thermodynamics

- ◆ Understand the concept of refrigeration
- ◆ Identify various refrigerants and their properties
- ◆ Describe the components of the A/C system and control mechanisms
- ◆ Describe how different types of automotive A/C systems work
- ◆ Describe the function and how the air distribution system works

## Fundamentals of Automotive Air Conditioning

The image displays three overlapping screenshots from the 'Fundamentals of Automotive Air Conditioning' courseware. The top screenshot, titled 'Refrigerants and A/C', explains that hot air is replaced by cold air and shows a diagram of the refrigeration cycle with components like the Compressor, Evaporator, Condenser, and Expansion Valve. The middle screenshot, titled 'Thermal Expansion Valves (TXV) | TXV: Pressure Controls', details how TXVs regulate refrigerant flow and includes a detailed diagram of the valve mechanism with numbered parts. The bottom screenshot, titled 'Air Conditioning Basics | Heat Energy', discusses the sources of heat in a vehicle and includes a diagram of a car with arrows indicating heat entering from the sun, engine, road, and exhaust.

*A selection of pages from CTI's **Fundamentals of Automotive Air Conditioning** courseware, featuring global navigation, instructional graphics, and glossary of terms*