

Course: **Auto Air Conditioning 101 - A Practical Approach**

Contact Hours: **24**

Pre-requisite: **Basic Automotive Knowledge**

Abstract

This course provides a comprehensive introduction to the components, operation and service techniques of automotive air conditioning systems. Participants will learn about refrigeration cycles, component functions, system diagnostics, as well as maintenance and repair practices. Participants will gain a solid foundation in automotive air conditioning, ensuring that they are well-equipped to handle common service and repair tasks in a professional setting.

Target Audience

- Persons interested in automotive maintenance
- Mechanic
- Persons who will be engaged in maintenance and repair technicians
- Entry-level Automotive AC Technicians
- HVAC Technicians

Learning Outcomes

- Understanding the basic operation and components of automotive air conditioning systems.
- Performing routine maintenance and service on automotive air conditioning systems.
- Diagnosing and repairing common issues in automotive air conditioning systems.
- Know how to properly repair the problem
- Recharge an air conditioning system
- Car air conditioning working principal, diagnose the problem and testing
- Safety tools and precautions

Course Content

Session 1: Introduction to Automotive Air Conditioning

Introduction into Health & Safety

- Overview of Automotive Air Conditioning systems
- How does Air Conditioning work in a vehicle?
- Purpose and importance of air conditioning in vehicles
- Basic principles of thermodynamics and refrigeration cycle

Session 2: Components of the Air Conditioning System

- Description of key components: compressor, condenser, evaporator, expansion valve
- Role and function of refrigerants (R12, R134a, R1234yf)
- Understanding blower units and duct systems.

Session 3: The Refrigeration Cycle

- Detailed look at the refrigeration cycle used in automotive systems
- Phase changes of refrigerant: evaporation, condensation, compression and expansion
- Heat exchange principles and how they apply to cooling a vehicle's cabin

Session 4: Air Conditioning Electrical and Control Systems

- Electrical components such as fuses, relays, pressure-switches, thermostats and controls, Radiator & Engine Fans, Blower Resistors, Blower Motors
- Wiring diagrams and electrical troubleshooting

Session 5: Diagnostics and Troubleshooting

- Common issues in air conditioning systems: leaks, restrictions, mechanical failures
- Using diagnostic tools like manifold gauges, thermometers, and electronic diagnostics
- Reading pressure and interpreting symptoms

Session 6: Maintenance and Service Procedures

- Routine maintenance of air conditioning systems
- Servicing steps including checking and replacing refrigerant, oil and filters
- Condensers & Evaporators
- Safety practices in handling refrigerants
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Session 7: Repair Techniques

- Repair and replacement of defective components
- Techniques for repairing leaks and damaged parts
- Retrofitting and upgrading older systems

Session 8: Hands-On Practical and Review

- Hands-on session to apply trouble-Shooting Techniques & Repairs on
- Compressors, Condensers, Blower Motors, Welding Aluminum Lines
- Group problem-solving session with case studies
- Review of course content and final assessment