

Course Book

| | | | | | |
|------------------------------------|---|-----------------------|-----------------|----------------------------------|--|
| Course Description | The purpose of this course is to promote learning by examining underlying assumptions, seeking relevant information and reaching final conclusions, thus understanding the implications of the diagnostic procedures in the following course concept areas: A/C Components, Controls, Refrigerant ID, A/C and Heating System testing and repair. | | | | |
| Course objectives | <p>Upon the completion of this course students will be able to complete the following:</p> <ol style="list-style-type: none"> 1. Given a transportation vehicle or related equipment with a fault in the A/C system, diagnose and repair the system using the recommended lab equipment and service information. 2. Utilize proper equipment to identify a given A/C refrigerant type and the purity of the A/C refrigerant for the transportation industry. 3. Given a transportation vehicle or equipment with an A/C system, determine the recommended refrigerant oil and capacity levels as prescribed from related service information. 4. Given a transportation vehicle or equipment with an A/C system, use the recommended equipment to properly reclaim, recycle, evacuate and recharge the entire refrigerant system. 5. Given a Heating Ventilation and Air Conditioning (HVAC) system, evaluate the anti-freeze coolant condition and perform a systems test as recommended by service information for a transportation vehicle or equipment. 6. Diagnose and repair a transportation vehicle or equipment with a fault in a protection device for the given A/C system. 7. Given an A/C system, remove and inspect system components and seals for damage which may cause the system to leak refrigerant. <p>Given a faulty climate control system, diagnose temperature control problems</p> | | | | |
| Student's obligation | The student must attendance the hall 2 hour and 3 hour in shop abidance the lecturer instruction wherein early attendance and bringing requisite tools and keep the hall clean and protect furniture. | | | | |
| Required Learning Materials | lecture halls with data show equipment for lecture presentations, white board, overhead projector, posters | | | | |
| Evaluation | Task | Weight (Marks) | Due Week | Relevant Learning Outcome | |
| | Paper Review | | | | |
| | Assignment | Homework | 5% | 3 | |
| | | Class Activity | 2% | | |
| | | Report | 10% | 2 | |
| Seminar | | 10% | 1 | | |

| | | | | |
|---|--|-------------|-------------------------|--|
| | Essay | | | |
| | Project | | | |
| | Quiz | 8% | 4 | |
| | Lab. | 10% | 7 | |
| | Midterm Exam | 25% | 1 | |
| | Final Exam | 40% | 1 | |
| | Total | 60% | | |
| Specific learning outcome: | <p>Upon completion of this course the student will be able to:</p> <ol style="list-style-type: none"> 1. Identify the purpose of the heating, ventilation and air conditioning system common parts of a HVAC system. 2. Describe how an air-conditioning system operates and explain why R-134a is the current refrigerant of choice. 3. Locate, identify, and describe the function of the various air-conditioning components 4. Describe the operation of the three types of air-conditioning control systems. 5. Describe methods used to check refrigerant leak, Perform basic heater operation tests. 6. Use approved methods and equipment to discharge, reclaim/recycle, evacuate, and recharge an automotive air-conditioning system. 7. Perform a performance test on an A/C system. <ol style="list-style-type: none"> 1. Interpret pressure readings as an aid to diagnose A/C problems. | | | |
| Course References: | <ol style="list-style-type: none"> 1. Auto Heating and Air Conditioning 2. Internet | | | |
| Course topics (Theory) | | Week | Learning Outcome | |
| Introduction to Automotive Heating, Air Conditioning, and Ventilation, HVAC Tools, Equipment, and Service Information | | 1 | 1 | |
| Principles of Refrigeration, Refrigerants, Refrigerant Oils, and Related Chemicals, Hoses, Lines, Fittings, and Seals | | 2 | 1 | |
| Compressors, Clutches, and Drives, Evaporators, Condensers, Accumulators, and Receiver-Driers | | 3 | 2 | |
| Control Valves and Switches | | 4 | 2 | |
| Engine Cooling Systems and Vehicle Heaters | | 5 | 3 | |
| Air Delivery Systems and Manual HVAC Controls | | 6 | 3 | |

| | | |
|--|-------------|-------------------------|
| Midterm Examination | 7 | |
| Midterm Examination | 8 | |
| Refrigeration System Diagnosis and Leak Detection | 7 | 5 |
| Heater and Engine Cooling System Service | 8 | 5 |
| Compressor and Clutch Service | 9 | 7 |
| Air Conditioning System Installation and Retrofitting | 10 | 6 |
| Hose, Line, Fitting, and O-ring Service | 11 | 8 |
| Valve, Evaporator, Condenser, and Related Parts Service | 12 | 4 |
| Practical Topics | Week | Learning Outcome |
| Perform Safety and Environmental Inspections, Identify and Interpret Vehicle Numbers, Find and Use Service Information. | 1 | 1 |
| Disable and Enable an Air Bag System, Diagnose an Air Conditioning System. | 2 | |
| Diagnose a Heating System, Diagnose Air Handling Components. Diagnose Heating and Air Conditioning Control Systems. | 3 | |
| Inspect and Test a Cooling System | 4 | |
| Recover Refrigerant, and Evacuate and Recharge an Air Conditioning System. | 5 | |
| Manage Refrigerant and Maintain Refrigerant. Handling Equipment, Remove and Replace a Heater Shutoff Valve. | 6 | |
| Remove and Replace a Compressor and Compressor Clutch | 7 | |
| Remove and Replace a Refrigeration Hose, Line, or Condenser | 8 | |
| Remove and Replace an Accumulator or Receiver-Drier | 9 | |
| Remove and Replace an Evaporator and Expansion Valve | 10 | |
| Remove and Replace a Blower Motor, Remove and Replace a Blower Motor Resistor Assembly, Remove and Replace an Air Door Actuator Assembly | 11 | |
| Replace Belts and Hoses | 12 | |

Questions Example Design

Compositional:

1. List Diagnostic and Test Equipment in Transportation Climate Control.
2. Talk about **Compressor**, and why list types of Compressors.

2. True or false type of exams:

1. Evaporator causes the refrigerant to turn into a vapor. (T)
2. The heater core is warmed by refrigerant. (F)

3. Multiple choices:

1. All of the following were used as friction material in early brake systems, EXCEPT:
A. brass. B. leather.
C. camel hair D. kevlar.
2. Technician A says that gases cannot be compressed. Technician B says that liquids cannot be compressed. Who is right?
A. A only. B. B only.
C. Both A & B. D. Neither A nor B.

Extra notes:

Student must be any time ready for quizzes.

External Evaluator

I have read the terms of this article and acknowledge that it meets the required purpose.

Ronak Ahmad Saeed

Assistant Lecturer

07504456089