



Lok Jagruti Kendra University
University with a Difference

Diploma in Automobile Engineering



Course Code: 025010501

Automobile Air-conditioning

Programme / Branch Name			Diploma in Automobile Engineering				
Course Name		Automobile Air-conditioning					Course Code
Course Type		HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses
 ESC: Engineering Science Courses
 OEC: Open Elective Courses

BSC: Basic Science Courses
 PCC: Program Core Courses
 PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week				Evaluation Scheme					
L	T	P	Total Teaching Hours	Total Credit	CA	CCE	SEE (TH)	SEE (PR)	Total
3	0	2	5	4	10	40	50	50	150

Legends: L: Lectures T: Tutorial P: Practical
 CA: Continuous Assessment (Attendance + Activity)
 CCE: Continuous & Comprehensive Evaluation
 SEE (Th): Semester End Evaluation (Theory)
 SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisite

- ✓ Thermal Engineering
- ✓ Physics

3. Rationale

The course aims to impart basic skills for understanding and working of various types of manufacturing processes such as casting, forging, extrusion, welding and machining processes. The manufacturing technology program provides relevant industrial experience within the academic environment to apply practical and theoretical concepts to improve manufacturing process.

4. Objectives

- ✓ Understand the working and types of manufacturing process.
- ✓ Understand the working and types of Shape changing process like rolling, forging, extrusion etc.
- ✓ Understand and grasp the deep knowledge about casting process and defects in casting.
- ✓ Understand and grasp the deep knowledge about welding process and defects in welding process.
- ✓ Understand the working principle of conventional and non-conventional Machine Tool and operations carried out on each Machine tool.



5. Contents

Unit No.	Unit Name	Topics	Learning Outcome	% Weightage	Hours
1.	Introduction to Vehicle Air-conditioning fundamentals	1.1 Need, Scope and requirements of Air condition. 1.2 Important Definitions and Refrigerant properties. 1.3 Air-conditioning principle with Schematic layout.	• Explain concepts of air conditioning • Describe air conditioning cycle.	10	04
2.	Vehicle Air-condition Components and It's working principle	2.1 Magnetic Clutch. 2.2 Types of Compressors. 2.3 Condenser and Evaporator. 2.4 Receiver dryer and filter. 2.5 Expansion Valves. 2.6 Thermostat switch and Blower motor. 2.7 Automotive air-conditioning controls.	• Describe various function of air conditioning components	30	20
3.	Heater Ventilation Air-condition System and Auto Climate Control Air-condition	3.1 Working of different automotive heaters. 3.2 Automatically controlled air-conditioning systems. 3.3 Automatic climate control air condition.	• Describe Automotive heaters and auto climate control air conditioning	15	06
4.	Servicing and Inspection of Air-conditioning System	4.1 Safety in the shop. 4.2 Periodic Maintenance 4.3 Discharging the air conditioning system. 4.4 Evacuation of the air conditioning system. 4.5 Charging of the air conditioning system. 4.6 Checking and inspection of air condition system	• Explain charging and discharging of air condition system	25	08
5.	Air-condition and Heater System Trouble-shooting	5.1 Causes of heater system troubles 5.2 Heater system, trouble diagnosis chart 5.3 Causes of Air-conditioner failure 5.4 Troubleshooting the air-conditioner system.	• Explain diagnosis and testing of air condition and heater system	25	04

**Total
Hours**

42



6. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1.	Introduction to Vehicle Air-conditioning fundamentals	40	40	20	0	0	0
2.	Vehicle Air-condition Components and It's working principle	35	50	15	0	0	0
3.	Heater Ventilation Air-condition System and Auto Climate Control Air-condition	30	50	30	0	0	0
4.	Servicing and Inspection of Air-conditioning System	20	60	20	0	0	0
5.	Air-condition and Heater System Troubleshooting	20	50	30	0	0	0

Legends: R: Remembering U: Understanding
 App: Applying C: Creating
 E: Evaluating An: Analyzing

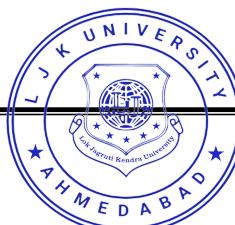
7. List of Practical / Exercises

Sr. No	Practical / Exercises	Key Competency	Hours
1	Test the Air Conditioning System for refrigerant leaks.	Student can Identify and understand various leaks in air condition system.	2
2	Perform Evacuation of the Air-conditioner system	Student can understand evacuation process.	2
3	Perform Recharging the Air-conditioner system	Student can understand refrigerant recharging process by using manifold gauge set.	2
4	Perform Air Conditioning system discharging with recovery unit.	Student can understand refrigerant recharging process.	2
5	Troubleshooting the Air-conditioner system	Student can understand the various troubles and their causes in air condition system.	2
6	Service Heating systems	Student can understand the servicing procedure vehicle heating system.	2
7	Service Air-conditioner	Student can understand the servicing procedure vehicle air conditioning system.	2

Total Hours **14**

8. Reference Books

- 1) Anil Chhikara Automobile Engineering (Volume -VI) Satya Prakashan
- 2) William H. Carouse & Donald L. Anglin Automotive Air conditioning Tata McGraw-Hill Co., Ltd., New Delhi
- 3) Steven Daly Automotive Airconditioning & Climate control system Butterworth-Heinemann
- 4) Mark Schnubel Automotive heating and air conditioning Cengage Publication



9. Open Sources (Website, Video, Movie)

- 1) <https://www.youtube.com/watch?v=e31HCvckZAU>
- 2) <http://youtu.be/e31HCvckZAU>
- 3) <https://www.youtube.com/watch?v=lN55uStu8Xs>
- 4) <http://youtu.be/lN55uStu8Xs>
- 5) <https://www.youtube.com/watch?v=PdQGS6mJjQ8>
- 6) <http://youtu.be/PdQGS6mJjQ8>
- 7) <https://www.youtube.com/watch?v=1-R8k0Rf76M>
- 8) <http://youtu.be/1-R8k0Rf76M>
- 9) <https://www.youtube.com/watch?v=QsxzcoYFWTk>
- 10) <http://youtu.be/QsxzcoYFWTk>
- 11) <https://www.youtube.com/watch?v=orflU-cvxco>
- 12) <http://youtu.be/orflU-cvxco>
- 13) <https://www.youtube.com/watch?v=2XjAZjqSC-k>
- 14) <https://www.youtube.com/watch?v=FiHr5V04dn>
- 15) <https://www.youtube.com/watch?v=8Yom2jLiKGA>
- 16) <http://youtu.be/8Yom2jLiKGA>
- 17) <https://www.youtube.com/watch?v=8kTyLkcu0dA>
- 18) <http://youtu.be/8kTyLkcu0dA>

