

Program : Diploma in Automobile Engineering	
Course Code : 6052D	Course Title: Automotive Air Conditioning System
Semester : 6	Credits: 4
Course Category: Open Elective	
Periods per week: 4 (L:3, T:1, P:0)	Periods per semester: 60

Course Objectives:

- To understand the air-conditioning systems used in automotive applications.
- To know the operation of air conditioning system, thermodynamic aspects involved and servicing of the system.

Course Prerequisites:

Topic	Course code	Course name	Semester
Heating systems		Heat Power Engineering	4

Course Outcomes:

On completion of the course, the student will be able to:

CO _n	Description	Duration (Hours)	Cognitive Level
CO1	Summarize different types of refrigeration systems and its applications	15	Understanding
CO2	Explain refrigeration and air conditioning systems	14	Understanding
CO3	Outline air distribution system and its control	15	Understanding
CO4	Make use of trouble shooting procedure of air conditioning system	14	Applying
	Series Test	2	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2						
CO2	3						
CO3	2						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	Summarize different types of refrigeration systems and its applications		
M1.01	Explain different methods of refrigeration and Air RefrigerationSystem applications	2	Understanding
M1.02	Summarizevapor compression refrigeration system and vapor absorptionrefrigeration system	2	Understanding
M1.03	Outline the applications of refrigeration & air conditioning -Automobile airconditioning	3	Understanding
M1.04	Summarize air conditioning for passengers in isolated and transport vehicles	3	Understanding
M1.05	List Commonly used refrigerants - Alternative refrigerants - Ecofriendly refrigerants.	3	Remembering
M1.06	Find the applications of refrigerants.	2	Remembering
Contents			
Introduction - Methods of Refrigeration - Air Refrigeration System and its Applications - VapourCompression Refrigeration System - Vapor Absorption Refrigeration System - Applications ofRefrigeration & Air Conditioning - Automobile Air Conditioning - Air Conditioning for Passengers, Isolated Vehicles and Transport Vehicles. Commonly Used Refrigerants - Alternative Refrigerants - Eco-Friendly Refrigerants - Applications of Refrigerants – Refrigerants Used in Automobile Air Condition			
CO2	Explain refrigeration and air conditioning systems		
M2.01	Summarize the classification and layouts - Central unitary air conditioning systems	2	Understanding
M2.02	Explain components like compressors, evaporators, condensers,expansion devices, fan blowers, heating systems etc	2	Understanding

M2.03	Factors forming the load on refrigeration & air conditioning systems	2	Understanding
M2.04	Make use of Cooling & heating load calculations	3	Applying
M2.05	Utilize Load calculations for automobiles	3	Applying
M2.06	Effect of air conditioning load on engine performance	2	Understanding
	Series Test – I	1	

Contents.

Classification and Layouts - Central / Unitary Air Conditioning Systems - Components Like Compressors, Evaporators, Condensers, Expansion Devices, Fan Blowers, Heating Systems Etc. Factors Forming the Load on Refrigeration & Air Conditioning Systems - Cooling & Heating Load Calculations - Load Calculations for Automobiles - Effect of Air Conditioning Load on Engine Performance

CO3	Outline air distribution system and its control		
M3.01	Explain distribution duct system, sizing, supply / return ducts	4	Understanding
M3.02	Outline grills, diffusers, ventilation, air noise level	3	Understanding
M3.03	Explain layout of duct systems for automobiles and their impact on load calculations	4	Understanding
M3.04	Outline Air Routine & Temperature Control: Objectives - evaporator care air flow - Through the dash recirculating unit	4	Understanding

Contents:

Distribution Duct System, Sizing, Supply / Return Ducts - Types of Grills, Diffusers, Ventilation, Air Noise Level - Layout of Duct Systems for Automobiles and their Impact on Load Calculations. Air Routine & Temperature Control - Objectives - Evaporator Care Air Flow - Through the Dash Recirculating Unit

CO4	Make use of trouble shooting procedure of air conditioning system		
M4.01	Explain air conditioner maintenance & service	3	Understanding
M4.02	Make use of servicing procedure on heater system - (Removing & replacing components.)	4	Applying
M4.03	Utilize Trouble shooting of air conditioning system	4	Applying
M4.04	Outline Compressor service, methods of dehydration, charging & testing	3	Understanding
	Series Test – II	1	

Contents:

Air Conditioner Maintenance & Service - Servicing Heater System - Removing & Replacing Components - Trouble Shooting of Air Conditioning System - Compressor Service, Methods of Dehydration, Charging & Testing.

Text / Reference:

T/R	Book Title/Author
T1	Refrigeration and Air-Conditioning - W.F. Stoecker and J.W. Jones, Tata McGraw Hill Pub.
R1	Paul Lung, "Automotive Air Conditioning", C.B.S. Publisher & Distributor, Delhi
R2	Modern Air-Conditioning Practice - Norman C. Harris, Principles of Refrigeration -R.J. Dcssat, Wiley Eastern Pub.
R3	Refrigeration and Air-Conditioning - C.P. Arora, Tata McGraw Hill Pub
R4	Refrigeration and Air-Conditioning – S.S.Thipse, Jaico

Online Resources:

Sl.No	Website Link
1	https://mechanicalnotes.com/refrigeration/
2	https://www.suezwatertechnologies.com/handbook/chapter-34-air-conditioning-and-refrigeration-systems
3	https://aristair.com/blog/air-conditioning-troubleshooting-9-common-problems-solutions/