GUJARAT TECHNOLOGICAL UNIVERSITY
AUTOMOBILE ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Automobile Air Conditioning System**
Subject Code: **170201**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	0	1	4	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Introduction to Air conditioning & Refrigeration:** Methods of refrigeration. vapour compression refrigeration system, vapour absorption refrigeration system, applications of refrigeration & air conditioning, Automobile air conditioning, air conditioning for passengers, isolated vehicles, Refrigerated transport vehicles, applications related with very low temperatures.	5
2.	**Importance of Refrigerant:** Classification, properties, selection criteria, commonly used refrigerants, alternative refrigerants, eco-friendly refrigerants, applications of refrigerants, refrigerants used in automobile air conditioning.	4
3.	**Study of Psychometric charts:** Psychometric properties, tables/charts, psychometric processes, comfort charts, factors affecting comfort, effective temperature, ventilation requirements.	6
4.	**Air Conditioning Systems:** Classification, layouts, central / unitary air conditioning systems. System components like compressor, evaporator, condenser, expansion devices, Receiver dryer, fan blowers, heating system etc. Switch and electrical wiring circuit.	8
5.	**Load Calculations & Analysis:** Design considerations for achieving desired inside/room conditions with respect to prevailing outside/environment conditions. Factors affecting/contributing towards the load on refrigeration & air conditioning systems. Cooling & heating load calculations. Load calculations for automobiles. Effect of air conditioning load on engine performance in terms of loss of available Peak Torque/Power and Fuel consumption.	7

6.	**Air Distribution Systems:** Distribution ducting, sizing, supply / return ducts, type of grills, diffusers, ventilation, air noise level, layout of duct systems for automobiles and their impact on load calculations.	5
7.	**Air Routing & Temperature Control :** Objectives of the dashboard re-circulating unit, automatic temperature control, controlling flow, control of air handling systems & air flow through - evaporator care	3
8.	**Air Conditioning Service:** Air conditioner maintenance & service - removing & replacing Components. Compressor service. Testing, Diagnosis & trouble shooting of air conditioning system. Refrigerant gas charging procedure &. Servicing of heater system.	4
9.	**Air Conditioning Control :** Common controls such as thermostats, humidistat, control dampers, pressure cutouts, relays.	3

Term Work:

The term work shall be based on the topics mentioned above.

Text Book:

1. "Automotive Air-Conditioning", by Crouse & Anglin – Mc Graw Hill Pub.

Reference Books:

1. "Automotive Air-Conditioning", by Paul Weiser – Reston Publishing Co.
2. "Automatic Heating & Air Conditioning Systems" – Mitchell Information Services.
3. "Air Conditioning", by Paul Lang, C.B.S. Publisher & Distributor, Delhi.
4. Principles of Refrigeration by Roy J. Dossat – Pearson Publication.
5. "Modern Air Conditioning", by Harris.
6. "Automobile Engg", by Anil Chhikara - Satya Prakashan.
7. "American Society of Heating, Refrigeration & Air Conditioning – Fundamentals", ASHRAE Handbook – 1985.