

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (I.C. ENGINE & AUTOMOBILE ENGINEERING) (11)

AUTOMOBILE REFRIGERATION & A/C

SUBJECT CODE: 2711107

SEMESTER: I

Type of course: Advanced/ Application

Prerequisite: -.Refrigeration & Air conditioning at under graduate level.

Rationale: Explain the operation of the basic refrigeration cycle; diagnose and repair air distribution systems; demonstrate proper procedures for handling refrigerant; and describe the operation of air conditioning and heating controls. Utilizing appropriate safety procedures with Air conditioner maintenance & service.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks		
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
		ESE			OEP	PA	RP			
4	2	0	5	70	30	30	0	20	0	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	Unit 1: Introduction; 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, transport vehicles; applications related with very low temperatures.	10	15
2.	Unit 2: Refrigerant: Classification, properties, selection criteria, commonly used refrigerants, alternative refrigerants, eco-friendly refrigerants, applications of refrigerants, refrigerants used in automobile air conditioning.	8	10
3.	Unit 3: Psychrometry (definitions and processes); Application of psychrometric processes of summer and winter air conditioning (applied psychrometry); review of refrigeration and air conditioning load calculations, 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; Human comfort; Comfort chart.	16	30
4	Unit 4: Air conditioning systems: Classification, layouts, central / unitary air conditioning systems, components like compressors, evaporators, condensers, expansion devices, fan blowers, heating systems, Automotive heaters, Control used in Refrigeration system, Air conditioning protection, Engine protection, Distribution duct system, sizing, supply / return ducts, type of grills, diffusers, ventilation, air noise level, layout of duct systems for automobiles and their impact on load calculations.	12	25

5	Unit 5: Air Conditioning Service: Air conditioner maintenance & service; servicing heater system, removing & replacing components; trouble shooting of air conditioning system; compressor service; methods of dehydration; charging & testing; Air Conditioning Control : Common control such as thermostats, humidistat, control dampers, pressure cut outs, relay.	10	20
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Reference Books:

1. Heating & Air Conditioning Systems – Mitchell Information Services
2. Refrigeration and Air conditioning, Stoecker, McGraw Hill
3. Paul Lung, “Automotive Air Conditioning”, C.B.S. Publisher & Distributor, Delhi.
4. Harris, “Modern Air Conditioning”.
5. ASHRAE Handbook – 1985 Fundamentals
6. William H. Crouse & Donald L. Anglin, “Automotive Air Conditioning”, McGraw Hill, Inc.1990.
7. Michel Information Services, Inc., Mitchell Automatic Heating & Air Conditioning Systems, Prentice Hall, Inc. 1989.
8. Paul Weisler, “Automotive Air Conditioning”, Reston Publishing Co. Inc. 1990
9. A text book of Refrigeration and Air conditioning, Arora and Domkundwar

Course Outcome:

After successful completion of the course, student will be able to:

1. Know the various refrigeration method
2. Know the properties and application of various refrigerant
3. Study the various psychrometric processes
4. Know the various Air Conditioning systems
5. Know the Air Conditioning systems of vehicles.