GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Diploma in Vocation (D.Voc), 3rd Semester
Branch: Refrigeration & Air Conditioning
Subject Name: Basics Air Conditioning
Subject Code: 1230403

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory		Tutorial/ Practical		
L	P	OJT	C	University exams (ESE)	Progressive Assessment (PA)	External Practical /viva Exam(ESE)	Internal evaluation Practical /viva Exam(PA)	
3	0	0	3	50	0	0	0	50

L- Lectures; P- Practical; OJT- On Job Training; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Program Objectives:

- Understand the basic terminology used in air conditioning.
- Identify desirable properties of refrigerants.
- Identify various types of compressors used in AC systems.
- Identify comfort conditions for human occupancy.
- Detect refrigerant leakage using basic methods.

Course Content: Theory

Unit No.	Content	No. of Hours
1.	**Introduction to Air Conditioning** Definition and need of air conditioning, Difference between refrigeration and air conditioning, Applications of air conditioning, Comfort air conditioning, Industrial air conditioning Types of air conditioning systems Window AC Split AC Central AC Basic terminology used in air conditioning.	8
2	**Principles of Refrigeration and Air Conditioning** Basic principles of refrigeration, Vapour Compression Refrigeration System (VCRS) Functions of main components: Compressor Condenser Expansion device Evaporator Refrigerants: Desirable properties, Common refrigerants used in AC systems Introduction to COP and ton of refrigeration (TR).	9
3	**Components Used in Air Conditioning Systems** Compressors: Types (Reciprocating, Rotary, Scroll) Condensers: Air-cooled and Water-cooled Evaporators:	10

	Types and applications Expansion devices: Capillary tube Thermostatic Expansion Valve (TEV), Fans, blowers, filters, and controls Copper tubes, fittings, insulation materials.	
4	**Psychrometry and Air Conditioning Processes** Introduction to psychrometry Properties of air: Dry bulb temperature (DBT) Wet bulb temperature (WBT) Relative humidity (RH) Psychrometric chart and its use Basic air conditioning processes: Sensible heating and cooling Humidification and dehumidification Comfort conditions for human occupancy	7
5	**Installation, Safety, and Maintenance of Air Conditioning Systems** Installation procedures of window and split AC, Electrical connections and earthing Safety precautions in AC installation and servicing, Tools and equipment used in AC servicing Basic maintenance practices: Cleaning filters and coils Checking refrigerant leakage Common faults and basic troubleshooting	8
	Total	42

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
10	15	10	10	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Refrigeration and Air Conditioning – C.P. Arora
2 RAC Servicing Technician (Handbook)– National Skill Development Corporation (NSDC) / Skill India
3. Refrigeration and Air Conditioning by Raghuwanshi & Raghuvanshi - Kataria & Sons

(b) Open source software and website:

1. https://www.skillindiadigital.gov.in
2. https://bharatskills.gov.in
3. https://nimi.gov.in
4. https://nptel.ac.in/

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Understand fundamentals of air conditioning systems.
02	Identify and explain AC components and their functions.
03	Apply basic psychrometric concepts.
04	Follow safe installation and maintenance practices.
05	Perform basic troubleshooting in air conditioning systems.