

REFRIGERATION AND AIR CONDITIONING

VII Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AME017	Core	L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil			Total Classes: 60	
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> Understand vapour compression, vapour absorption and air refrigeration systems. Analyze the refrigeration cycles and methods for improving the performance using standard data hand book with p-h charts. Familiarize the components of refrigeration system. Identify various psychometric properties and processes. <p>COURSE OUTCOMES (COs):</p> <p>CO 1: Understand the types, properties of stones, manufacturing process of bricks, types of bricks and aggregates.</p> <p>CO 2: Describe the different types of cements, admixtures, manufacturing process, properties of cement, ingredients of cement concrete and tests conducted on concrete.</p> <p>CO 3: Identify the components of building, types of foundations and differentiate types of materials depending on its function.</p> <p>CO 4: Describe the properties of wood, aluminium, glass and different types of wood, masonry used in buildings.</p> <p>CO 5: Explain principles of building planning, building by laws, classification of buildings and stairs.</p> <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> Derive COP of HP, R & HE Describe the working of Carnot refrigerator and its applications. Describe the working of vapor compression refrigeration cycle. Construction of PH charts & solves the problems. Classifying and Demonstration of compressors. Demonstration of working of condensers. Demonstration of working of evaporators. Classifying and Demonstration of expansion devices. Demonstration of Aqua-Ammonia VARS. Illustration of Li-Br VARS. Explanation of principle & Demonstration of Electrolux. Discuss the air refrigeration cycles and its applications. Discuss the various properties of air. Draw and calculate various sensible heat factors. Draw & Describe comfort and industrial air conditioning. Calculate the air conditioning loads. Classify the equipment of air conditioning. Describe the importance of filters, grills, registers & Explain the working of fans and blowers. Discuss the various heat pump sources. 								

20. Draw heat pump circuits and Discuss their applications.		
Unit-I	INTRODUCTION TO REFRIGERATION	Classes: 12
Basic concepts: unit of refrigeration and COP, refrigerators, heat pump, Carnot refrigerator, applications of refrigerators, air refrigeration: Bell-Coleman cycle, open and dense air system, ideal and actual refrigeration, applications, vapor compression refrigeration, ideal cycle, effect of sub cooling of liquid, super heating of vapor, deviations of practical (actual cycle) from ideal cycle, construction and use of p-h chart problems.		
Unit -II	VAPOUR ABSORPTION REFRIGERATION AND AIR REFRIGERATION	Classes: 12
Vapor absorption refrigeration: description, working of NH ₃ -Water, Li Br–water system, calculation of HCOP, Principle and operation of three fluid vapor absorption refrigeration systems. Steam jet refrigeration system, working principle, basic operation; Refrigerants: Properties, nomenclature selection of refrigerants, effects of refrigerants on global warming, alternate refrigerants.		
Unit -III	REFRIGERATOR COMPONENTS	Classes: 12
Compressors: classification, working, advantages and disadvantages; Condensers: classification, working Principles.		
Evaporators: classification, working Principles; Expansion devices: types, working principles.		
Unit -IV	INTRODUCTION TO AIR CONDITIONING	Classes: 12
Psychometric properties and processes, sensible and latent heat loads, characterization, need for ventilation, consideration of Infiltration, load concepts of RSHF, ASHF, ESHF and ADP; concept of human comfort and effective temperature, comfort air conditioning, industrial air conditioning and requirements, air conditioning load calculations.		
Unit -V	AIR CONDITIONING SYSTEMS	Classes: 12
Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, deodorants, fans and blowers, heat pump, heat sources, different heat pump circuits, applications.		
Text Books:		
<ol style="list-style-type: none"> 1. Manohar Prasad, “Refrigeration and Air Conditioning” New Age International, 3rd Edition, 2015 2. S. C. Arora, Domkundwar, A Course in Refrigeration and Air-conditioning, Dhanpatrai Publications, Edition 2014. 		
Reference Books:		
<ol style="list-style-type: none"> 1. C. P. Arora, Refrigeration and Air Conditioning” Tata McGraw-Hill, 17th Edition, 2006. 2. Ananthanarayanan, Basic Refrigeration and Air Conditioning”, Tata McGraw-Hill, 2015. 3. R.K.Rajput, A text of Refrigeration and Air Conditioning” S. K. Kataria & Sons, 3rd Edition, 2009. 4. P. L. Ballaney, Refrigeration and Air Conditioning” Khanna Publishers, 16th Edition, 2015. 		
Web References:		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/112105128/ 2. https://nptel.ac.in/courses/112107208/ 		
E-Text Books:		
<ol style="list-style-type: none"> 1. https://www.brijrbedu.org/Brij20Data/Refrigeration20and20Air Conditioning/ Book/ A20 Text book 20of20 2. https://www.pdfdrive.com/refrigeration-and-air-conditioning-fourth-edition-e34330234.html 		