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**SECOND SEMESTER 2020-2021**

# Course Handout Part II

Date: 16-01-2021

In addition to part-I (general handout for all courses in the time table) this handout provides the specific details regarding the course.

**Course No.: ME F461**

**Course Title: Refrigeration and Air-conditioning**

**Instructor-in-charge: SANDIP DESHMUKH**

**Instructor: R Parameshwaran**

**Scope and Objective:** The course is designed to give an in-depth study of theory of refrigeration and air-conditioning and their applications. The techniques of analysis and design of refrigeration and air-conditioning systems will also be discussed.

**Text Book:** Arora C.P. ‘Refrigeration and Air-conditioning’, 3rd Ed Tata McGraw Hill Co, 2000

## **Reference Books:**

1. Manohar Prasad, ‘Refrigeration and air-conditioning’, Wiley Eastern Ltd, 1983

2. Roy J. Dossat, ‘Principles of Refrigeration’, 4nd Ed, Pearson Education Asia, 2002

3. Edward G. Pita, ‘Air Conditioning Principles and Systems’, 4nd Ed, Pearson Education Asia, 2003

**Course Plan:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Lect No.** | **Learning Objectives** | **Topics to be covered** | **Reference to Text** |
| 1 | Introduction & Review | Introduction, the second law interpretation, the Carnot principle | 1,2 |
| 2-5 | Gas cycle refrigeration | Limitation of Carnot cycle, reversed Brayton cycle, Air craft refrigeration, Analysis of Gas cycle refrigeration | 11 |
| 6-9 | Vapour compression system | Modification in reversed Carnot cycle, Vapour compression cycle, Vapour compression system calculation, etc | 3 |
| 10-13 | Multi-pressure systems | Multi stage compression, Multi evaporative systems | 5 |
| 14-15 | Compressors | Principle & performance of reciprocating compressor | 6 |
| 16 | Condensers | Types, Heat transfer in condensers | 7 |
| 17 | Evaporators | Types, Heat transfer in evaporators | 8 |
| 18 | Expansion Valves | Types of expansion devices | 9 |
| 19 | Refrigerants | Designation of refrigerants, comparative study, selection of refrigerant | 4 |
| 20-23 | Vapour absorption system | Vapour absorption system | 12 |
| 24-28 | Psychrometry of air-conditioning processes | Psychrometric properties, Basic processes in conditioning of air, Psychrometric processes in air-conditioning equipment’s, Summer & Winter air-conditioning | 14,15 |
| 29-32 | Load Calculations – Cooling & Heating | Design conditions, solar radiations, heat transfer through building structure | 17,18,19 |
| 33-36 | Design of air-conditioning systems | Heat and moisture transfer in air-conditioning equipments | 20 |
| 37-38 | Transmission and distribution of air | Friction loss, dynamic losses in ducts, Air flow through simple duct system, air duct design | 21, 22 |
| 39-42 | RACE Lab Visits (in Video mode) | Four visits to RACE Lab to be planed during the duration of the course |  |

**Evaluation Scheme:**

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| --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Evaluation Component** | **Duration** | **Weightage (%)** | **Date & Time** | **Nature of Component** |
| 01 | Mid Semester Test | 90 min. | 30 | 03/03 3.30 - 5.00PM | Open Book |
| 03 | Surprise Quiz/Test | 10 min | 20 | Best 5 out of 7 | Open Book |
| 04 | Survey Assignment |  | 10 | To be announced | Open Book |
| 05 | Compre. | 2 hrs | 40 | 08/05 FN | Open Book |

**Chamber Consultancy Hour:** To be announced by the instructor in the class.

**Notices:** All the notices concerning this course will be displayed on *Google Classroom*.

**Make-up Policy:** Make-up for the tests shall be granted only for the genuine cases with sufficient evidence. Request for the make-up tests, duly signed by the students, should reach the under signed well before the scheduled test.

**Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

##### Instructor-in-Charge

#### ME F461