Instruction Division
First Semester 2015-16
Course Handout Part II

06/01/2016

In addition to part I this portion gives further specific details regarding the course.

Course No. **ME F461**
Course Title: **Refrigeration and Air-conditioning**
Instructor In-charge: **Shyam Sunder Yadav**

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

Text Books:

Arora, C.P. Refrigeration and Air-conditioning, 3rd Ed. TMH 2009.

Reference Books:

1. Manohar Prasad, refrigeration and air-conditioning, Wiley Esteen Ltd, 1983.
2. Ray J. Dossat, Principles of refrigeration, 4th ed.Pearson education Asia, 2002.
3. C P Kothandaraman, Refrigerant Tables and Charts, Including Air Conditioning Data, Second addition, New Age International Publication.

Course Plan:

Lect No.	Learning Obective	Topic to be covered	Ref. to text
01	Introduction and review	Introduction, the second law interpretation, Carnot principle	1,2
02	Gas Cycle Refrigeration	Limitation of Carnot cycle, reversed Brayton Cycle	11
03	Gas Cycle Refrigeration	Air Craft refrigeration	11
04	Gas Cycle Refrigeration	Joule Thomson Coefficient, Inversion Curve	11
05	Gas Cycle Refrigeration	Analysis of Gas Cycle Refrigeration	11
06	Vapour Compression Systems	Modification of reversed Carnot cycle, VCRS	03
07	Vapour Compression Systems	Vapour Compression Systems calculation	03
08	Vapour Compression Systems	Effect of operating condition on VCRS	03
09	Vapour Compression Systems	Actual Vapour Compression Systems	03
10-11	Multi-Pressure Systems	Multi-Stage Compression Systems	05
12	Multi-Pressure Systems	Multi-evaporative systems	05
13	Multi-Pressure Systems	Cascade Systems, Dry Ice	05
14	Compressors	Principle and performance of reciprocation , rotary and centrifugal compressor	06
15	Condensers	Types and Heat transfer in condensers	07
16	Evaporators	Types and Heat transfer in evaporators	08
17	Expansion devices	Types of exp Device and design of Capilliary Tubes and Ejector	09

		Expansion	
18	Refrigerants	Designation, Comparative study of Refrigerants and their selection, Chemical and physical Requirements, and substitute of Refrigerants	04
19	Vapour Absorption Systems	Principle of Vapour Absorption Systems	12
20	Vapour Absorption Systems	Li-Br Vapour Absorption Systems and Electrolux systems	12
21	Psychrometry of Air-conditioning Processes	Psychrometric Properties, charts, Application of first law	14
22	Psychrometry of Air-conditioning Processes	Basic of Air-conditioning Processes	15
23	Psychrometry of Air-conditioning Processes	Psychrometry of Air-conditioning Processes Equipment	15
24	Psychrometry of Air-conditioning Processes	Summer Air Conditioning	15
25	Psychrometry of Air-conditioning Processes	Winter Air Conditioning	15
26	Load Calculations-cooling and heating	Design condition, solar radiation, heat transfer through structures	16,17 , 18
27-28	Load Calculations-cooling and heating	Heat Gains, Cooling and Heating Load estimation	19
29-30	Load Calculations-cooling and heating	Psycrometric Calculation, selection of air conditioning apparatus	20
31	Design of AC Systems	Design of cooling and dehumidifying Coils, Spray Equipments	20
32	Transmission and Distribution of Air	Friction and dynamic losses of ducts, Air flow through simple ducts	21
33	Transmission and Distribution of Air	Transmission and Distribution of Air in rooms, and duct design	21-22

Evaluation Scheme:

Components	Duration	Weight age (%)	Date & Time	Remarks
Mid Sem Test	90 min.	30	15/3 2:00 -3:30 PM	**Closed Book / Open Book**
Minor Projects/Assignment/Case Study	-	10	Continuous	
Quiz	-	20		**Closed book**
Compre.	3 hrs.	40	6/5 FN	**Closed Book/Open Book**

- Chamber Consulting Hours will be announced.
- All notice related to this course will be put on the Mechanical Engineering Dept. Notice Board.
- Make up will be given to extremely genuine students, but prior permission required.
- **No makeup for quizzes. Best two quizzes out of three will be considered.**

Instructor-in-charge