



Course Specifications of: Thermal Loads and Psychrometry MEP 505

Program(s) on which the course is given: Diploma in Power Engineering
(Refrigeration and Air Conditioning Technology (RACT))

Compulsory or Elective element of program: Compulsory

Department offering the program: Mechanical Engineering/ Power

Academic year / Level: year/ 2014/2015

Date of specification approval: 2012

A. Basic Information

Title: *Thermal Loads and Psychrometry*

Code: MEP 505

Credit Hours: 3

Lecture: 3

Tutorial:

Practical:

Total: 3

B- Professional Information

1- Overall aims of course:

This course introduces students to:

- 1- Apply the acquired knowledge, skills, and attitudes in his professional practice.
- 2- Solve professional problems related to calculate thermal loads of buildings
- 3- Use energy efficiently in the design and operation processes of refrigeration and air conditioning units.

2- Intended learning outcomes of course (ILOs)

By completion of the course, the student should be able to:

a- Knowledge and understanding

- a.1 Identify theories and specialized knowledge in the area of heat and thermal load and categorize sciences related to the professional practice.(2.1.1)
- a.2 List principles of professional practice in the area of refrigeration and air conditioning technology. (2.1.2)
- a.3 discuss the Current problems in summer and winter air conditioning cycles (2.1.3)
- a.4 Identify the different types of thermal loads of Refrigeration and HVAC systems..(2.1.5)

b- Intellectual skills

- b.1 Analysis the problems in the area of thermal load and categorize them according to their priority. (2.2.1)
- b.2 Solve theoretical problems to represent summer and winter cycles of air conditioning. (2.2.2)
- b.3 Make professional decisions in the light of available information. (2.2.5)

**c- Professional and practical skills**

- c.1 Apply professional skills in the area of thermal load estimation.(2.3.1)
- c.2 Prepare professional reports. (2.3.2)

d- General and transferable skills

- d.1 Use different sources for obtaining information and knowledge. (2.4.4)
- d.2 Work in a group and manage time effectively.(2.4.5)
- d.3 Conduct self-learning and continuous education practices. (2.4.7)

3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Psychrometric chart and Thermal load sources for cooling and heating	1	3
2	Solar heat gain	1	3
3	Heat transitions through buildings	2	6
4	Ventilation load	1	3
5	Ventilation- Properties of air	1	3
6	Dry and wet bulb temperature - dew point	1	3
7	Specific volume - the partial pressure of water vapor - humidity	2	6
8	Psychometry chart – human comfort zone	2	6
9	Summer Psychrometric cycles	2	6
10	Effect of pressure on the properties of the humid air on loads.	1	3
11	Exam	1	3
	Total	15	45

4- Course Matrix

ILO's code number	Teaching/learning methods and strategies	Assessment methods and strategies
2.1.1 2.1.2 2.1.3 2.1.5	Formal lectures	Individual coursework assignments, quizzes, oral discussions and reports. Mid year and /or final written examination is given.
2.2.1 2.2.2 2.2.5	Analysis and problem-solving skills are developed through tutorial/problem sheets and small group exercises.	Analysis and problem-solving skills are assessed through oral and written examinations. Design and research skills are assessed through project write-



		ups, coursework and project reports.
2.3.1 2.3.2	Virtual Experiments demonstrations, laboratory visits.	Practical skills are assessed through laboratory experimental write-ups, coursework exercises and reports, project reports and presentations.
2.4.4 2.4.5 2.4.7	Those skills are not explicitly taught; however, along the course of study the student will acquire those skills to be able to perform his obligations. Attendance of seminars, workshops or conferences will help the student in developing those skills. Presentation by students (either group or individual) will train students for those skills.	Project presentation

5- Assessment schedule

Assessment 1	Assignments	on weeks	1, 3, 6
Assessment 2	Quizzes	on weeks	2, 4, 9, 13
Assessment 3	Mid-term exam	on weeks	8
Assessment 3	Oral exam	on week	14
Assessment 4	Final exam	on week	15

6- Weighting of assessments

- 10% Home assignments
- 10 % Quizzes, Reports
- 20% Mid-term examination, Oral examination
- 60% Final-term examination
- 100% Total

7- List of References**7.1 Essential books (Text books)**

Handbook of HEATING, VENTILATION, and AIR CONDITIONING
Ed. Jan F. Kreide Boca Raton, CRC Press LLC. 2001

7.2 Recommended books; Periodicals & Websites.

ASHRAE 2000 HVAC Systems and Equipment Handbook
ASHRAE 2005 Fundamentals Handbook

8- Facilities required for teaching and learning

Lecture room equipped with overhead projector
Presentation board, computer and data show

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Head of department: Prof. Dr. Osama Ezzat Abdellatif



Matrix of course content and ILO's**Course Title:** Thermal Loads and Psychrometry **Code: MEP 505****Lecture:** 3. **Tutorial:** **Practical:** ---- **Total:** 3**Program on which the course is given:** Diploma in Power Engineering**Major or minor element of program:** Compulsory**Department offering the program:** Mechanical Engineering / Power**Department offering the course:** Mechanical Engineering / Power**Academic year / level:** 2014/2015. **Date of specifications approval:** 2012

Course content	ILO's A	ILO's B	ILO's C	ILO's D
Psychrometric chart and Thermal load sources for cooling and heating	a1	b1,b3		d1
Solar heat gain	a1	b3		d1
Heat transitions through buildings	a2	b1,b2		d2
Ventilation load	a3	b1		d2
Ventilation- Properties of air	a4	b1	c1	d1
Dry and wet bulb temperature - dew point	b1	b3	c2	d3
Specific volume - the partial pressure of water vapor - humidity	a1	b2		
Psychrometry chart – human comfort zone	a1	b1,b3		
Summer Psychrometric cycles	a3,a4	b1		
Effect of pressure on the properties of the humid air on loads.	a3,a4	b1		

**Matrix of course aims and ILO's**

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Course aims	ILO's A	ILO's B	ILO's C	ILO's D
1-Apply the acquired knowledge, skills, and attitudes in Heat and mass transfer applications	a1,a2	b2	c2	
2-Solve professional problems related to calculate thermal loads of buildings		b2	c1	d2
3-Use energy efficiently in the design and operation processes of refrigeration and air conditioning units.	a2	b3	c1	d3