



Course Specifications of:

Selected Topics in Refrigeration and Air Conditioning (MEP 705)

Program(s) on which the course is given: Ph.D. in Mechanical Power Engineering

Compulsory or Elective element of program: Elective

Department offering the program: Mechanical Power Engineering

Academic year / Level: year/ 2014/2015

Date of specification approval: 2012

A. Basic Information

Title: Selected Topics in Refrigeration and Air Conditioning

Credit Hours: 3

Tutorial:

Practical:

Code: MEP 705

Lecture: 3

Total: 3

B- Professional Information

1- Overall aims of course:

This course aims to provide the student with:

- 1-Advanced design and modern technology of different ventilation systems.
- 2-Make technical decisions for the design and construction of cold and freezing stores.
- 3-Develop new methods, tools and techniques through a small subject oriented research project.
- 4-Use of the appropriate technological means to detect the faults in air conditioning equipment.

2- Intended learning outcomes of course (ILOs)

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

2.1 Knowledge and understanding

- a1. Demonstrate the effects of refrigeration and air conditioning on the environment and ways of development and maintenance of the environment. (2.1.2)
- a2. Summarize the role of ethics in refrigeration and air conditioning professional practice and the procedures followed to conduct a scientific research. (2.1.4)
- a3. Explain the basic principles of ensuring higher levels of quality in professional refrigeration and air conditioning practice. (2.1.5)
- a4. Have the ability to respect interdisciplinary, and the roles and expertise of others professionals. (2.1.8)



2.2 Intellectual skills

- b1. Capable to educate others, which may include teaching and supervision. (2.2.2)
- b2. Ability to plan and improve the performance in the refrigeration and air conditioning field. (2.2.6)
- b3. Have creativity and make good decisions in different professional aspects. (2.2.7)
- b4. Add new information to the knowledge by carry out a research studies in the refrigeration and air conditioning field. (2.2.10)
- b5. Formulate valuable research questions in the refrigeration and air conditioning field. (2.2.11)

2.3 Professional and practical skills

- c1. Perform basic professional and modern skills in the area of refrigeration and air conditioning engineering according to the relevant codes of practice. (2.3.1)
- c2. Evaluation and writing technical reports in the field of refrigeration and air conditioning. (2.3.2)
- c3. Use the various software programs for simulating the refrigeration and air conditioning system features.(2.3.6)
- c4. Ability to identify research opportunities and use of the appropriate technological means to serve refrigeration and air conditioning practice. (2.3.9)

2.4 General and transferable skills

- d1. Capacity to communicate ideas effectively to a range of audiences inside and outside the refrigeration and air conditioning field. (2.4.1)
- d2. Analyzing and synthesizing information or data from a variety of sources and demonstrate effective IT capabilities to serve the development in the refrigeration and air conditioning field. (2.4.3)
- d3. Capability to demonstrate of ethical, legal, social and civic responsibility as a researcher and member of refrigeration and air conditioning and ability to lead the team work. (2.4.6)
- d4. Ability to demonstrate a high level of competence the management of time and scientific meetings. (2.4.7)

3- Contents

No. of weeks	Topic	Total no. of hours
1	New Refrigeration methods	3
2 3	Advanced Design and applied of cold stores	6
4	Modern Air conditioning systems	3
5	Air properties control	3
6	Presentation of air process on the psychometric chart	3



7	Presence of the actual A/C systems for both cooling and heating seasons on the psychometric chart	3
8	Mid term	3
9	Advanced Cooling load estimation for summer application	3
10	Mid term	3
11	Advanced Cooling load estimation for winter application -	6
12	Advanced Air duct design manual and using software	
13	Selection of fans and determination of its motor power	3
14	Oral	3
15	Exam	3
Total		45

4- Course Matrix

LO's code number	Teaching/learning methods and strategies	Assessment methods and strategies
2.1.2 2.1.4 2.1.5 2.1.8	Formal lectures	Individual coursework assignments, quizzes, oral discussions and reports. Mid-year and /or final written examination is given.
2.2.2 2.2.6 2.2.7 2.2.10 2.2.11	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 2.3.6 2.3.9	Virtual Experiments demonstrations, laboratory visits.	Practical skills are assessed through laboratory experimental write-ups, coursework exercises and reports, project reports and presentations.
2.4.1 2.4.3 2.4.6 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

- 20% (60 marks) Home assignments, Quizzes, and reports
- 20% (60 marks) Mid-term examination and Oral examination
- 60% (180 marks) Final-term examination
- 100% (300 marks) Total

7- List of References

7.1 Essential books (Text books)

Handbook of HEATING, VENTILATION, and AIR CONDITIONING
 Ed. Jan F. Kreider
 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

Course coordinator: Prof. Dr. Ramadan M .Amer

Course instructor: Prof. Dr. Ramadan M .Amer

Head of Department: Prof. Dr. Osama Ezzat



Matrix of course content and ILO's

Course Title: Selected Topics in Refrigeration and Air Conditioning **Code:** MEP705

Lecture: 3. **Tutorial:** ---- **Practical:** ---- **Total:** 3

Program on which the course is given: Ph.D. in Mechanical Power Engineering.

Major or minor element of program: Elective

Department offering the program: Mechanical Engineering / Power

Department offering the course: Mechanical Engineering / Power

Academic year / level: year 2014/2015

Date of specifications approval: 2012

Course content	ILO's A	ILO's B	ILO's C	ILO's D
New Refrigeration methods	a1,a2	b4		d2
Advanced Design and applied of cold stores	a2,a3	b3		d1
Modern Air conditioning systems	a1	b1	c1	
Air properties control	a2	b2		
Presentation of air process on the psychometric chart	a1	b3		
Presence of the actual A/C systems for both cooling and heating seasons on the psychometric chart	a1,a3	b4	c2	
Advanced Cooling load estimation for summer application	a2		c1,c4	d1
Advanced Cooling load estimation for winter application	a2		c2	
Advanced Air duct design manual and using software	a1	b5		
Selection of fans and determination of its motor power	a2			d1,d2
Chilled water piping network design and pump selection	a1,a4			d3



Matrix of course aims and ILO's

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Code: MEP705

Lecture: 3.

Tutorial: ----

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1- Advanced design and modern technology of different ventilation systems.	a1, a2	b1		
2- Make technical decisions for the design and construction of cold and freezing stores.	a2		c1,c3	
3- Develop new methods, tools and techniques through a small subject oriented research project.	a1, a2	b4	c2	
4- Use of the appropriate technological means to detect the faults in air conditioning equipment.	a2	b2	c2	d1,d4