



Benha University



Faculty of Engineering at Shoubra

Course Specification- Diploma. (2014-2015)

Course Specifications of: Desalination Systems MEP 513

Program(s) on which the course is given: Diploma in Mechanical Power Engineering
(Conventional and Renewable Power Plants)

Compulsory or Elective element of program: Elective

Department offering the program: Mechanical Engineering / Power

Academic year / Level: year/ 2014/2015

Date of specification approval: 2012

A. Basic Information

Title: *Desalination Systems*

Credit Hours: 3

Tutorial:

Practical:

Code: *MEP 513*

Lecture: 3

Total: 3

B- Professional Information

1- Overall aims of course:

For students undertaking this course, the aims are to:

1. recognize the basic information of systems of Water Desalination
2. Increase the theoretical and practical skills of systems of Water Desalination
3. Identify how to design, install and maintain water Desalination plants.

2- Intended learning outcomes of course (ILOs)

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

2.1 Knowledge and understanding

- a1. Identify fundamentals and specialized knowledge in water desalination. (2.1.1)
- a2. Outline the scientific developments in water desalination. (2.1.2)
- a3. Discuss on the effects of the water desalination on the environment. (2.1.4)

2.2 Intellectual skills

- b1. Discern the problems in water desalination and categorize them according to their priority. (2.2.1)
- b2. Solve study of conventional and renewable power plants problems in water desalination. (2.2.2)
- b3. Analysis and criticize research papers and topics related to water desalination area of study of conventional and renewable power plants. (2.2.3)
- b4. Assess the risks and hazards in water desalination. (2.2.4)

2.3 Professional and practical skills

- c1. Apply professional skills in the area of study of conventional and renewable power plants. (2.3.1)



c2. Prepare professional reports. (2.3.2)

2.4 General and transferable skills

d1. Use information technology in water desalination. (2.4.1)

d2. Work in a group and Lead a team in water desalination. (2.4.2)

d3. Use different sources for obtaining information and knowledge. (2.4.4)

3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Introduction	1	3
2	Chemistry of Sea water	1	3
3	Methods of Water Desalination	1	3
4	Multi-Stage Flash Thermal Desalination	2	6
5	Multi-Effect Desalination	1	3
6	Types of Membranes Technology	1	3
7	Mid Term	1	3
8	Ro Desalination Plant, system Design	1	3
9	Operation of RO Desalination Plants	1	3
10	Energy Improvement by ERDs	1	3
11	Performance Analysis of recovery and Flux in RO Plants	1	3
12	Other Desalination Technologies	1	3
13	Economics of Water Desalination Plants	1	3
14	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 2.1.4	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 2.2.3 2.2.4	Analysis and problem-solving skills are developed through tutorial/problem sheets and small group exercises. Research skills are developed through a small subject oriented research project.	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	Experiments demonstrations, practical work, laboratory visits.	Practical skills are assessed through laboratory experimental



		write-ups, coursework exercises and reports, project reports and presentations.
2.4.1 2.4.2 2.4.4	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 Text books

- 1- "Fundamentals of Salt Water Desalination", H.T. El-Dessouky, H.M. Ettouney, College of Engineering and Petroleum, Kuwait University, ELSEVIER, 2002.
- 2 – "Membrane Filtration Handbook", Jorgen Wagner, B.Sc. Chem.Eng, Osmonics, USA, November 2001.

7.2 Websites

- * Yahoo mail group
- * Yahoo scribd.com
- * www.sciencedirect.com

8- Facilities required for teaching and learning

Presentation board, computer and data show
Laboratory

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Head of Department: Prof. Dr. Osama Ezzat Abdellatif



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Matrix of course content and ILO's

Course Title: *Desalination Systems*

Code: **MEP 513**

Lecture: 3.

Tutorial: ----

Practical: ----

Total: 3

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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
Introduction	a1, a2			
Chemistry of Sea water	a1, a2, a3			
Methods of Water Desalination	a2, a3			
Multi-Stage Flash Thermal Desalination	a1, a2	b1		
Multi-Effect Desalination	a1, a2			
Types of Membranes Technology			c1	d1
Ro Desalination Plant, system Design		b1,b3		
Operation of RO Desalination Plants	a1	b1		d1
Energy Improvement by ERDs			c1,c2	d2
Performance Analysis of recovery and Flux in RO Plants	a2	b2	c2	
Other Desalination Technologies			c1,c2	d2
Economics of Water Desalination Plants	a3	b4		d3



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1- Know the basic information of systems of Water Desalination.	a1, a2, a3	b2		d1
2- Increase the theoretical and practical skills of systems of Water Desalination.	a1, a3	b1	c1	
3- Identify how to design, install and maintain water Desalination plants.	a2	b1	c2	