



**Course Specifications of:  
Selected Topics in Renewable Energy (MEP 708)**

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

**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:** Selected Topics in Renewable Energy

**Code:** MEP 708

**Credit Hours:** 3

**Lecture:** 3

**Tutorial:**

**Practical:**

**Total;** 3

**B- Professional Information**

**1-Overall aims of course:**

This course aims to provide the student with:

1. Discuss the advanced concepts of renewable energy.
2. Enhance professional problems related to the design and installation of renewable energy systems and developing energy strategies.
3. Apply the control systems of solar collectors, solar cells and wind turbines.

**2- Intended learning outcomes of course (ILOs)**

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

**2.1 Knowledge and Understanding**

- a1. Have a significant knowledge in the methodologies, ethics at the forefront of renewable energies. (2.1.1)
- a2. Demonstrate environmental impact of renewable energy engineering professional practice. (2.1.2)
- a3. Search for scientific developments in the area of renewable energy engineering. (2.1.3)
- a4. Describe the current energy problems in critically evaluated manner. (2.1.6)
- a5. Understand and respect the values, principles of quality, methods and limitations in the professional practice in renewable energies. (2.1.8)



## 2.2 Intellectual Skills

- b1. Analyze and assess information in renewable energy engineering and draw analogies to solve energy problems. (2.2.1)
- b2. Capable to educate others, which may include teaching and supervision. (2.2.2)
- b3. Exploit different knowledge sources to solve renewable energy problems. (2.2.3)
- b4. Capability to write scientific papers. (2.2.4)
- b5. Engage effectively in the renewable energy philosophy and discourse of mechanical power engineering. (2.2.9)
- b6. Add new information to the knowledge by carry out a research studies in the renewable energies field. (2.2.10)

## 2.3 Professional and Practical Skills

- c1. Evaluation and writing technical reports in the field of renewable energies. (2.3.2)
- c2. Adaptation assessment methods and tools existing in the area of renewable energies field. (2.3.3)
- c3. Use the different instruments for measuring the hybrid system properties safely and according to the specified accuracy. (2.3.7)
- c4. Produce research opportunities and use of the appropriate technological means to serve renewable energy 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 renewable energies field. (2.4.1)
- d2. Accessing information and managing time at an advanced level. (2.4.2)
- d3. Capability to demonstrate of ethical, legal, social and civic responsibility as a researcher and member of renewable energies and ability to lead the team work. (2.4.6)
- d4. Conduct self-learning and continuous education practices.(2.4.8)

### 1- Contents

No. of weeks	Topic	Total no. of hours
1 2	Energy: Past, Today, and Future. A brief history of energy consumption.	6
3 4	Sun and its Energy: Basics of Solar Energy	6
5 6	Solar Thermal Energy	6
7	Solar Photovoltaic	3
8	Mid term	3



9	Wind Resources	6
10		
11	Wind Turbines	3
12	Ocean Energy	3
13	Geothermal Energy	3
14	Oral	3
15	Exam	3
Total		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 2.1.6 2.1.8	Identify theories, fundamentals and specialized knowledge in types of renewable energies Outline the scientific developments in renewable energy. Describe principles and fundamentals of quality in professional practice in the wind and solar energy.	Acquisition of core knowledge and understanding is achieved mainly through lectures, seminars, tutorials, directed reading, project work and independent study. Assessment will be through individual coursework assignments, quizzes, oral discussions and reports. In addition final written examinations are given. The grades distribution system is shown in the curriculum table below.
2.2.1 2.2.2 2.2.3 2.2.4 2.2.8 2.2.10	Discern and analyze the problems in the renewable energy and categorize them according to their priority  Solve study of energy problems.	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.
2.3.2 2.3.3 2.3.8 2.3.9	Apply professional skills in the area of study of renewable energy. Prepare professional reports.	Experiments demonstrations, practical work, laboratory visits, work on the final dissertation or thesis.
2.4.1 2.4.2 2.4.6 2.4.8	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.	<ul style="list-style-type: none"> <li>• Presentations in annual seminars</li> <li>• Attendance of workshops or conferences or internal seminars.</li> <li>• Writing scientific paper/s (compulsory before obtaining the degree).</li> <li>• Thesis or dissertation preparation</li> </ul>



## 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

Course notes Prepared by the instructor:

- Bent Sorensen, "Renewable energy :its physics, engineering, use, environmental impacts, economy, and planning aspects" Elsevier Academic Press, 2004, 952 pages.

Barker Library, TJ163.2.S66 2004

- John Twidell, Tony Weir, Anthony D. Weir "Renewable Energy Resources", Taylor & Francis, 2005, 601 pages.

Barker Library, TJ808.T95 2006

### 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

Course coordinator      **Prof. Osama Ezzat Abdellatif**  
 Course instructor

**Head of Department Prof. Osama Ezzat Abdellatif**

**Matrix of course content and ILO's****Course Title: Selected Topics in Renewable Energy Code: MEP 708.****Lecture: 3 Tutorials: 3 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
Energy: Past, Today, and Future. A brief history of energy consumption.	a2,a5			
Sun and its Energy: Basics of Solar Energy	a1, a2	b1,b5		d3
Solar Thermal Energy	a1, a2	b1		d2
Solar Photovoltaic	a1, a2	b1,b3		d1
Wind Resources	a1, a2		c2	
Wind Turbines	a2, a3	b2,b4	c1,c3	
Ocean Energy	a2, a3		c2	d2
Geothermal Energy	a2, a3		c2	

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Course aims	ILO's A	ILO's B	ILO's C	ILO's D
1- Discuss the advanced concepts of renewable energy.	a2,a4	b1,b6		d3
2- Enhance professional problems related to the design and installation of renewable energy systems and developing energy strategies.	a1, a2		c1,c4	d3, d4
3- Apply the control systems of solar collectors, solar cells and wind turbines.	a3, a4	b2	c3,c4	d1, d2