Course Specifications of: Renewable Energies MEP 603

Program(s) on which the course is given : Post Graduate **M .Eng.** in Mechanical 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: Renewable Energies **Code: MEP 603**
Credit Hours: 3 **Lecture: 3**
Tutorial: **Practical:** **Total; 3**

B- Professional Information

1- Overall aims of course:
This course introduces students to:

1.1 Provide fundamental background in the Renewable Energies and its performance in mechanical engineering.
1.2 Capable of conveying the principles and practice for the different renewable energy systems including the control systems of solar collectors, solar cells and wind turbines and its applications in mechanical engineering.
1.3 Establish the physical principles and the most important techniques in the renewable energy systems and it applications in mechanical engineering.

2- Intended learning outcomes of course (ILOs)
By completion of the course, the student should be able to:

2.1 Knowledge and understanding

a1. Define theories, fundamentals and specialized knowledge in renewable energy systems. (2.1.1)
a2. Demonstrate environmental impact of renewable energy engineering professional practice. (2.1.2)
a3. Outline the scientific developments renewable energy systems.(2.1.3)
a4. Summarize the role of ethics in renewable energy professional practice and the procedures followed to conduct a scientific research. (2.1.4)

2.2 Intellectual skills

b1. Analyze and assess information in the renewable energy systems.(2.2.1)
b2. Conduct a research study and/or write a scientific essay about renewable energy systems.(2.2.4)
b3. Plan for performance development in solar and wind energy systems.(2.2.6)
b4. Make professional decisions in various professional contexts.
(2.2.7)

2.3 Professional and practical skills

c1. Perform basic professional and modern skills in renewable energy systems. (2.3.1)

c2. Assess methods and current tools in renewable energy system.(2.3.2)
c3. Use the various software programs (ANSYS software) for simulating the renewable energy system features. (2.3.6)

a- General and transferable skills

d1. Experiment information technology renewable energy system.(2.4.2)
d2. Set basis and standards to assess the performance of others. (2.4.5)
d3. Work in a group and lead a team in renewable energy system. (2.4.6)
d4. Conduct self-learning and continuous education practices.(2.4.8)

3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Introduction to Renewable Energies	1	3
2	Solar radiation , solar angles , solar system, solar collectors	2	6
3	Thermal compilation, water heating	1	3
4	Economics of solar energy, high temperature solar collectors	2	6
5	Integrated solar systems	1	3
6	Concentrators, performance solar systems in the long term	2	6
7	Indirect heating system	1	3
8	Energy storage control systems in the field of energy storage	2	6
9	Wind, geothermal energy, bio-energy, tidal energy	2	6
10	Exam	1	3
11	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 2.1.4	Formal lectures	Individual coursework assignments, quizzes, oral discussions and reports. Mid-year and /or final written examination is given.
2.2.1 2.2.4 2.2.6 2.2.7	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 2.3.6	Experiments demonstrations, practical work, laboratory visits.	Practical skills are assessed through laboratory experimental write-ups,

		coursework exercises and reports, project reports and presentations.
2.4.2 2.4.5 2.4.6 2.4.8	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

* Course notes Prepared by the instructor:
* Wind and Solar power system
By: Mukund R. Patel, Ph.D., P.E.

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

Prepared by: **Prof. Dr. Osama Ezzat**

Head of Department: Prof. Dr. Osama Ezzat

Matrix of course content and ILO's

Course Title: **Renewable Energies** **Code**: **MEP 603.**
Lecture: 3 Tutorials: 3 **Practical**: ---- **Total:** 3
Program on which the course is given: Post Graduate **M. ENG**. in mechanicalPower 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
1. Introduction to Renewable Energies	a2,a4			
2. Solar radiation , solar angles , solar system, solar collectors	a1, a2	b1,b2		d3
3. Thermal compilation, water heating	a1, a2	b1		d2
4. Economics of solar energy, high temperature solar collectors	a1, a2	b1,b3		d1
5. Integrated solar systems	a1, a2		c2	
6. Concentrators, performance solar systems in the long term	a2, a3	b2,b4	c1,c3	
7. Indirect heating system	a2, a3		c2	d2,d4
8. Energy storage control systems in the field of energy storage	a2, a3		c2	

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Course aims	ILO's A	ILO's B	ILO's C	ILO's D
1) Provide fundamental background in the Renewable Energies and its performance in mechanical engineering.	a2,a4	b1,b4		d3
2) Capable of conveying the principles and practice for the different renewable energy systems including the control systems of solar collectors, solar cells and wind turbines and its applications in mechanical engineering.	a1, a2		c1,c3	d3, d4
3) Establish the physical principles and the most important techniques in the renewable energy systems and it applications in mechanical engineering.	a1,a3	b2,b3	c2	d1,d2