



Course Specifications of: Wind Energy MEP 514

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: *Wind Energy*

Credit Hours: 3

Tutorial:

Practical:

Code: *MEP 514*

Lecture: 3

Total: 3

B- Professional Information

1- Overall aims of course:

This course introduces students to:

- 1- Recognize the scientific, technical and economic aspects of wind power plants elements.
- 2- Enhance professional problems related to the design and installation of wind energies systems and developing power plants strategies.
- 3- Promote awareness to the different components and functions of automatic control and measurement systems used in wind power plant.

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 theories and specialized knowledge in wind power plants. (2.1.1)
- a2. Outline the scientific developments in wind power plants. (2.1.2)
- a3. Describe fundamentals of quality in professional practice in the wind power plants. (2.1.3)
- a4. Discuss the effect of professional practice on the environment and work towards its conservation and maintenance. (2.1.4)

2.2 Intellectual skills

- b1. Analyze the problems in the wind power plants and categorize them according to their priority. (2.2.1)
- b2. Solve study of wind power plant problems. (2.2.2)
- b3. Analysis and criticize research papers and topics related to wind energy study. (2.2.3)

**2.3 Professional and practical skills**

- c1. Prepare professional reports.(2.3.2)
- c2. Ability to plan and implement experiment design and evaluate testing (2.3.3)

2.4 General and Transferable Skills

- d1. Use different sources for obtaining information and knowledge.(2.4.4)
- d2. Self-learning and continuous education practices (2.4.7)

3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Introduction - Current Status of Wind Power Worldwide	2	6
2	Governing equations of wind power systems - theory of the momentum and mass conservation	2	6
3	Constructing Wind-Energy Systems	2	6
4	Installing and Operating wind power system	1	3
5	Blowing through Vital Wind-Energy Principles	1	3
6	Aerodynamics characteristics of wind turbines	1	3
7	Wind-System components - Wind system Installation..	1	3
8	Betz limit for the power factor of the turbine of horizontal axis	1	3
9	Checking Out the Rest of the System Components	1	3
10	Weighing Wind Generator Options	1	3
11	The properties of winds near the surface of the earth - power generated – use buildings to increase the power extraction - photoelectric cells	1	3
12	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 2.1.4	Describe principles and fundamentals of quality in professional practice in the wind power plants. Explain the effect of professional practice on the environment and work towards its conservation and maintenance.	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	Discern and analyze the problems in the wind power plants and categorize them according to their priority.	Analysis and problem-solving skills are assessed through oral and written examinations.



	Solve study of nuclear power plant problems.	Design and research skills are assessed through project write-ups, coursework and project reports.
2.3.2 2.3.3	Apply professional skills in the area of study of wind energy. Prepare professional reports.	Experiments demonstrations, practical work, laboratory visits, work on the final dissertation or thesis.
2.4.4 2.4.7	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:

- Ian Woofenden, "Wind power for dummies", Copyright © 2009 by Wiley Publishing, Inc., Indianapolis, Indiana
- Thomas Ackermann, "Wind Power in Power Systems ", Royal Institute of Technology, Electric Power Systems, <http://www.ets.kth.se/ees>

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 Abdellatif

Head of Department: Prof. Dr. Osama Ezzat Abdellatif



Matrix of course content and ILO's

Course Title: *Wind Energy***Code:** *MEP 514***Lecture:** 3 **Tutorials:** 3**Practical:** ----**Total:** 3**Program on which the course is given:** Diploma 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:** 2014/2015. **Date of specifications approval:** 2012

Course content	ILO's A	ILO's B	ILO's C	ILO's D
Introduction - Current Status of Wind Power Worldwide	a2			
Governing equations of wind power systems - theory of the momentum and mass conservation	a1, a2	b1		d1
Constructing Wind-Energy Systems	a1, a2	b1		d1
Installing and Operating wind power system	a1, a2	b2		d2
Blowing through Vital Wind-Energy Principles	a1, a2		c1	
Aerodynamics characteristics of wind turbines	a2, a3	b1	c1,c2	
Wind-System components - Wind system Installation..	a2, a3		c1	d2
Betz limit for the power factor of the turbine of horizontal axis	a2, a3		c1,c2	
Checking Out the Rest of the System Components	a3, a4			d2
Weighing Wind Generator Options	a3, a4		c1	d2
The properties of winds near the surface of the earth - power generated – use buildings to increase the power extraction - photoelectric cells	a3			

**Matrix of course aims and ILO's****Course Title:** *Wind Energy***Code:** *MEP 514* .**Lecture:** 3 **Tutorials:** 3**Practical:** ----**Total:** 3**Program on which the course is given:** Diploma 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:** 2014/2015. **Date of specifications approval:** 2012

Course aims	ILO's A	ILO's B	ILO's C	ILO's D
1- Understand the scientific, technical and economic aspects of wind power plants elements.	a1	b1, b3	c1	d1
2- Enhance professional problems related to the design and installation of wind energies systems and developing power plants strategies.	a1, a2	b1	c1,c2	d1
3- Promote awareness to the different components and functions of automatic control and measurement systems used in wind power plant.	a3, a4	b2		d1, d2