



Philadelphia University

Faculty of Engineering - Department of Electrical Engineering
Second Semester 2016/2017

Course Details:

- Title:** Wind Energy Lab. (0611536)
- Prerequisite:** Wind Energy Systems (0611531)
- Credit Hours:** 1 credit hours (3 hours per week)
- Textbook:** Laboratory manuals
- References:**
1. Wind turbines: fundamentals, technologies, application, economics. By Erich Hau.
 2. Wind Energy Explained: Theory, Design and Application, by J. F. Manwell, J. G. McGowan, A. L. Rogers.
- Course Description:**
1. To introduce the operation performance of wind turbine.
 2. At completing this module the student should be able to:
 - Learn the components of the wind turbine.
 - Using the instruments to measure the wind turbine variables and indicate its characteristics.
- Website:** <http://www.philadelphia.edu.jo/academics/fobeidat>
- Instructor:** Dr. Firas Obeidat
Email: fobeidat@philadelphia.edu.com
Office: Engineering building, room 6714, ext: 2450
Office hours: Sun, Tues, Thurs: 10:00-11:00 and 12:00-02:00.
Thu and Wed: 09:00-11:15 and 12:45-02:00

Course Outlines:

Week	Topic
1	Introduction
2	Study of the conversion of kinetic wind energy into electrical energy.
3	Study of the power generated by the aerogenerator depending on the wind speed.
4	Determination of the typical parameters of the aerogenerator (short circuit current, open-circuit voltage, maximum power), and I-V curve.
5	Study of voltage, current and power in function of different loads and the influence of the load variation on the aerogenerator.
6	Study of the power generated by the aerogenerator depending on the incident angle of the air.
7	Study of the aerogenerator operation in function of the blade configuration (aerogenerator with 6, 3 or 2 blades), and the optimum number of blades.
8	Study of the efficiency of a wind power unit.
9	Study of the connection of loads to alternating voltage of 220V.
10	Study of the inverter connected to the grid simulator.

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this lab, student should:

1.	Ability to understand the operations and characteristics of the wind turbine	[a, b, d, g, k]
2.	Ability to understand the different connections of the wind turbine with other elements.	[a, b, d, g, k]
3.	The ability to measure wind speed, generator speed, voltage, current, power and other electrical parameters.	[a, b, d, g, k]

Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

Quizzes: (3-5) quizzes of (10-15) minutes will be conducted during the semester. The materials of the quizzes are set by the lab.

Reports: 10

Final Exam: The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the lab.

Grading policy:

First Exam	"Quizzes (5%), reports (12%) and performances (3%)" 20%
Second Exam	"Quizzes (5%), reports (12%) and performances (3%)" 20%
Third Exam	"Quizzes (5%), reports (12%) and performances (3%)" 20%
Final Exam	"Practical 30% and Theoretical 10%" 40%
<hr/>	
Total:	100%

Attendance Regulation:

The semester has in total 16 weeks. Total absence hours from classes must not exceed 15% of the total week. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the lab. If the excuse is approved by the deanship the student will be considered withdrawn from the lab.

February, 2017