



# Philadelphia University

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

## Course Details:

**Title:** Wind energy systems (0611531)

**Prerequisite:** Mechanical vibrations (0620414)

**Credit Hours:** 3 credit hours (16 weeks per semester, approximately 45 contact hours)

**Textbook:** Wind turbines: fundamentals, technologies, application, economics. By Erich Hau.

**References:** Wind Energy: An Introduction, by Mohamed A. El-Sharkawi, CRC Press.

**Course Description:** The course is a requirement for level 5 renewable energy engineering students. It introduces the basic principles and analysis of wind energy systems.

**Website:** <http://www.philadelphia.edu.jo/academics/fobeidat>

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**Instructor:** **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	Historical applications of wind energy
2,3	Electrical Power from the Wind and the batteries
4, 5, 6	Wind energy system (rotor blades, the tower, Mechanical Drive, Electrical System, etc)
7, 8	Physical Principles of Wind Energy Conversion
9, 10	Basic concepts of wind energy Converters (turbines)
11, 12, 13	Aerodynamics of turbines
14, 15, 16	Using computer software for wind energy analysis

## Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1.	Understand the origin and development of windmills and wind turbines.	[b, e]
2.	Understand the first attempts of electrical power generation from wind	[c, k]
3.	Understand the main components of wind energy system and its functions	[b, c, d]
4.	Understand the equations used to convert the air kinetic energy into mechanical energy	[a, b]
5.	Able to know the different types of wind turbines	[c]
6.	Understand rotor aerodynamics	[a, e]
7.	Be able to know how to design wind energy system by software	[k]

### Assessment Guidance:

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

**Sub-Exams:** The students will be subjected to two scheduled written exams, first exam and second exam during the semester. Each exam will cover materials given in lectures in the previous 3-4 weeks.

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

**Homework and projects:** Tutorials sheets will be handed out to the students and homework should be solved individually and submitted before or on a set agreed date. Student may be assigned to present project(s).

Cheating by copying homework from others is strictly forbidden and punishable by awarding the work with zero mark.

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

### Grading policy:

First Exam	20%
Second Exam	20%
Quizzes and Homework	20%
Final Exam	40%

Total: 100%

### Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. 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 course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.