



# Philadelphia University

Faculty of Engineering - Department of Renewable Energy  
Engineering  
Second Semester 2016/2017

## Course Information

- Title:** Photovoltaic Systems (0611422)
- Prerequisite:** Electronics (0650242)
- Credit Hours:** 3 credit hours (16 weeks per semester, approximately 44 contact hours)
- Textbook:** Photovoltaic Systems 2nd Edition ,2009 ,by James P. Dunlop. ISBN-13: 978-0826913081, ISBN-10: 0826913083.
- References:** 1- Photovoltaic Systems Engineering, Third Edition. Feb 26, 2010, by Roger Messenger and Amir Abtahi, ISBN-13: 978-1439802922 , ISBN-10: 1439802920.  
2- Solar Photovoltaic Basics: A Study Guide for the NABCEP Entry Level Exam Stg Edition, (2009) by Sean White (Author). ISBN-13: 978-0415713351, ISBN-10: 0415713358, 343\$.
- Catalog Description:** Introduction to renewable and historical overview, Functioning of the photovoltaic cells Efficiency of solar cells, Types of solar photovoltaic cells, Energy depreciation of photovoltaic cells, Photovoltaic system types, conversion and specifications, Charge regulators, Power factor Energy, Network-connected photovoltaic systems (on-grid), Network-connected home systems (possibility for own consumption), Network-connected solar power plants (farms), Standalone systems (off-grid) or isolated systems, Hybrid systems, Independent, . systems for economic purposes..
- Website:** <http://www.philadelphia.edu.jo/academics/wagahfm/> Dr Wagah Al-Azzawi
- Email:** wagah2000@yahoo.co.uk.
- Instructor:** **Office:** Engineering building, room 6728, ext: 2180.  
**Office hours:** Sun, Tues, Thurs: 11:10-13:10 and Mon, Wed: 10:00 - 12:00

## Course Topics

Week	Topic
1	Introduction to renewable energy and historical overview of solar cells
2, 3	Functioning of the photovoltaic cells and Efficiency of solar cells
4, 5	Types of solar photovoltaic cells and Energy depreciation of photovoltaic cells
6, 7	Photovoltaic system types, conversion and specifications
8,9	Charge regulators, Power factor Energy
10,11	Network-connected photovoltaic systems (on-grid)
12, 13	Network-connected home systems (possibility for own consumption) and Network-connected solar power plants (farms),
14, 15	Standalone systems (off-grid) or isolated systems, Hybrid systems, Independent, . systems for economic purposes.
16	Review, and final exam

## Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should:

1.	Study Photovoltaics, Wind power, Micro hydropower, Biomass energy, Waste power and Solar thermal power.	[a, h]
2.	Study other technologies, Geothermal power, Ocean energy (tidal, tide-flow and wave), Ocean energy (OTEC).	[a, h]
3.	Comparison of characteristics and cost of renewables	[e, h]
4.	use the sun, wind, biomass, geothermal resources, and water to generate more sustainable energy	[c, h]
5.	illustrates how energy from the sun is transferred	[a, h]
6.	Storage used for heating, cooling, and lighting; collected and concentrated; and converted into electricity	[a, h]
7.	Understand five energy storage categories: electrical, electromechanical, mechanical, direct thermal, and thermochemical	[a, h]

### Assessment Instruments:

Evaluation of students' performance (final grade) will be based on the following categories:

**Exams:** Two written exams will be given. Each will cover about 3-weeks of lectures

**Quizzes:** 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

**Homework:** Problem sets will be given to students. Homework should be solved individually and submitted before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

**Participation:** Questions will be asked during lecture and the student is assessed based on his/her response

**Final Exam:** The final exam will cover all the class material.

### Grading policy:

First Exam	20%
Second Exam	20%
Homeworks	5%
Quizzes	15%
Final Exam	40%
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Total:	100%

### Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

February, 2017