Philadelphia University

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

Course Information

Title: Energy Conversion and Efficiency (0611311)

Prerequisite: Electrical Machines (0610314)

Credit Hours: 3 credit hours (16 weeks per semester, approximately 44 contact hours)

Textbook: Energy Conversion: Systems, Flow Physics and Engineering (Oxford Engineering Science Series), by Reiner Decher (Author), ISBN-13: 978-

References: 1- Energy Conversion, edited by D. Yogi Goswami, Frank Kreith . Publisher: Boca Raton : CRC Press, Taylor & Francis Group, ©2008.

Catalog Description: Discussing methods for maximizing available energy, Energy Conversion , advances in energy conversion from a wide variety of currently available energy sources. Describes energy sources such as fossil fuels, biomass including refuse-derived biomass fuels, nuclear, solar radiation, wind, geothermal, and ocean, then provides the terminology and units used for each energy resource and their equivalence. A comprehensive description of the direct energy conversion methods, including, Photovoltaics, Fuel Cells, Thermoelectric conversion, Thermionics and MHD. It briefly reviews the physics of PV electrical generation, discusses the PV system design process. discusses five energy storage categories: electrical, electromechanical, mechanical, direct thermal, and thermochemical and the storage media that can store and deliver energy.

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Course Topics

Week	Topic
1&2	Discussing methods for maximizing available energy, Energy Conversion , energy conversion from a wide variety of currently available energy sources
3,4	Describes energy sources such as fossil fuels, biomass including refuse-derived biomass fuels, nuclear, solar radiation, wind, geothermal, and ocean,
5	provides the terminology and units used for each energy resource and their equivalence
6, 7	A comprehensive description of the direct energy conversion methods,

8,9	including, Photovoltaics, Fuel Cells, Thermoelectric conversion, Thermionics and MHD
10,11	briefly reviews the physics of PV electrical generation,
12,	discusses the PV system design process
13, 14	discusses five energy storage categories: electrical, electromechanical, mechanical, direct thermal, and thermochemical
15	the storage media that can store and deliver energy.
16	Review, and final exam

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should:

1.	Understand the operation of energy conversion.	[a, c]
2.	Discussing methods for maximizing available energy.	[a, e]
3.	Understand energy conversion from a wide variety of currently available energy sources	[a, e]
4.	Be able to Describes energy sources	[c, h]
5.	Understand the operation of the direct energy conversion methods	[a, h]
6.	Be able to understand the physics of PV electrical generation,	[a , c]
7.	Understand five energy storage categories: electrical, electromechanical, mechanical, direct thermal, and thermochemical	[a]

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%
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