The Hashemite University
Faculty of Engineering
Course Syllabus
Department of Mechanical Engineering

Course Title:	Renewable Energy (3,0,0)	**Course Number:**	110402564
Designation:	Elective	**Prerequisite(s):**	110402324
Instructor:	Dr. Salem Nijmeh	**Email:drnijmeh@hu.edu.jo**	
Office Hours:	12:00 – 14:00: Sun. & Tue., 12:30 – 2:00: Mon. & Wed.		
Required Course:	3 hours lectures per week		

Course Description :
Energy Situation in Jordan. Fundamentals of solar radiation.Solar radiation angles, measurements and availability. Selected heat transfer Topics. Radiation transmission through glazing. Study of Flat-Plate Collectors. Solar Photovoltaics. Solar distillation. Wind Energy. Introduction to Geothermal and Biomass Energy.

Textbook(s) and/or Other Supplementary Materials:
Duffie J.A., and Beckman W.A.,"Solar Engineering of Thermal Processes", 2006, Wiley and sons, New York.

References:
1. Godfrey Boyle, " Renewable Energy – Power for a Sustainable Future", Oxford, UK.
2. Research papers

Major Topics Covered:

Topic	# Weeks	# Contact hours*
Solar radiation	3	9
Heat transfer topics	2	6
Radiation characteristics of opaque surfaces and glazing	2	6
Flat plate collectors	2	6
Solar distillation	1	3
Photovoltaic systems	2	6
Wind energy	1	3
Geothermal and biomass energy	2	6
Total	**15**	**45**

*Contact hours include lectures, quizzes and exams

Specific Outcomes of Instruction (Course Learning Outcomes):
After completing the course, the student will be able to:

1. To understand the basic ideas and calculation procedures of solar radiation(a),(e)
2. To provide a thorough understanding of the principles of solar thermal energy systems(a),(e)
3. Design and analyze solar photovoltaic systems.(a),(c),(e),(k)
4. Describe various types of renewable energy systems.(e),(j)
5. To introduce students to the practical aspects of renewable energy system design(c),(e),(k)
6. Conduct a research project and present it professionally(c),(g),(i),(j),(k)

Grading Plan:

First Exam	(30 Points)
Project and class work	(30 Points)
Final Exam	(40 Points)

Student Outcomes (SO) Addressed by the Course:

#	Outcome Description	Contribution
General Engineering Student Outcomes		
(a)	an ability to apply knowledge of mathematics, science, and engineering	M
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	H
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	H
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	L
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	M
(j)	a knowledge of contemporary issues	M
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	H
H=High, **M**= Medium, **L**=Low		

Prepared by: Dr. Salem Nijmeh **Date:** 18/09/ 2019