

#### 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:**

Торіс	#	# Contact
	Weeks	hours*
olar radiation	3	9
Heat transfer topics	2	6
Radiation characteristics of opaque surfaces and glazing		6
Flat plate collectors		6
Solar distillation	1	3
Photovoltaic systems	2	6
Wind energy		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	М		
(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,	н		
	social, political, ethical, health and safety, manufacturability, and	11		
	sustainability			
(d)	an ability to function on multidisciplinary teams			
(e)	an ability to identify, formulate, and solve engineering problems	Н		
(f)	an understanding of professional and ethical responsibility			
(g)	(g) an ability to communicate effectively			
(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	М		
	learning	101		
(j)	a knowledge of contemporary issues	М		
(k)	an ability to use the techniques, skills, and modern engineering tools	Ц		
	necessary for engineering practice.	11		
H=High, $M$ = Medium, $L$ =Low				

Prepared by:

Dr. Salem Nijmeh

**Date:** 18/09/ 2019