The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Solar Energy and Power Generation	0904917	

2025 Course Catalog Description

Introduction. Primary energy and consumption, available solar energy Physics of the ideal solar cell. Light absorption PN junction characteristic values of the solar cell efficiency. Physics of the real solar cell. Charge carrier recombination characteristics, junction layer recombination, and equivalent circuit. Increasing the efficiency. Methods for increasing the quantum yield, and reduction of recombination. Straight and tandem structures. Hetero-junction, Schottky, electrochemical, MIS and SIS-cell tandem cell. Concentrator. Concentrator optics and tracking systems. Technology and properties: types of solar cells, manufacture, single crystal silicon and gallium arsenide, polycrystalline silicon, and silicon thin film cells, thin-film cells on carriers (amorphous silicon, CIS, electrochemical cells) Modules.Circuits.

Instructors

Name	E-mail	Section	Office Hours	Lecture Time

Prerequisites

Prerequisites by topic	
Prerequisites by course	
Co-requisites by course	
Prerequisite for	

Topics Covered

Week	Topics
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Evaluation		
Assessment Tools	**Expected Due Date**	**Weight**

Contribution of Course to Meet the Professional Components

Relationship to Student Outcomes							
SOs	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Availability							

Relationship to Aeronautical Engineering Program Objectives (AEPOs)				
AEPO1	**AEPO2**	**AEPO3**	**AEPO4**	**AEPO5**

ABET Student Outcomes (SOs)	
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated by ABET Committee, 2025