جامعة الإسراء
ISRA UNIVERSITY

Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Advanced Solar Cells Systems

Course Number: 04085162

General Course Information:

Course title	Advanced Solar Cells Systems
Course number	04085162
Credit hours	Three h (theory)
Education type	Face-to-Face
Prerequisites/corequisites	04084261
Academic Program	Renewable Energy Engineering
Program code	REE
Faculty	Engineering
Department	Renewable Energy Engineering Department
Level of course	Fourth-year
Academic year /semester	2022/2023 First Semester
Awarded qualification	B.Sc.
Other department(s) involved in teaching the course	None
Language of instruction	English & Arabic
Date of production/revision	2022/2023

Course Coordinator:

Coordinator'sname	Dr.Nour Khlaifat
Office No	3rd floor,4348
Office Phone extension number	
Office Hours	Sunday: (10:00-12:00) & (1-2) (Sunday, Tuesday, Thursday): 10:00-12:00
Email	noor.alkhlaifat@iu.edu.jo

Other Instructors:

Instructorname	-
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description*(English/Arabic)*:

English	Advanced Solar Cells Systems course focuses on the scientific basis of the photovoltaic solar cells conversion and effect, solar cell operation, and the production of solar silicon and silicon-based solar cells and modules. The science and technology of up-and-coming thin-film solar cells, primary manufacturing processes for producing solar panels, environmental impacts, and the related system engineering aspects will be included to provide a comprehensive state-of-the-art approach to solar utilization. Stand-alone PV system components, designing stand-alone PV systems and sizing, analyzing the efficiency of solar cells, and Grid-connected PV also will be discussed.
Arabic	

Textbook: ***Author(s), Title, Publisher, Edition, Year, Book website.***

1.	Luque, &Hegedus, S. (2003). Handbook of Photovoltaic Science and Engineering. Wiley.

References: ***Author(s), Title, Publisher, Edition, Year, Book website.***

Wenham. (2011). Applied photovoltaics (3rd ed.). Earthscan.

Course Educational Objectives (CEOs):

1.	Describe (phenomenologically) the principal phenomena governing a PV device's function (and conversion efficiency)
2.	List currently commercialized technologies, and list the strengths weaknesses of each, and develop a cost model.
3.	Identify limitations to terawatt-scale deployment, and possible enabling strategies and technologies.
4.	Apply the above to a real-world project, evaluating complex trade-offs between technology, economics, policy, and social aspects.
5.	

IntendedLearning Outcomes (ILO's):

a.	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill, and competence that students acquire:	**Relationship to CEOs**	**Contribution to PLOs**	**Bloom Taxonomy Levels***	**Descriptors****
b. A	Knowledge and Understanding:				
c. A1	Describe (phenomenologically) the principal phenomena governing the function (and conversion efficiency) of a PV device.	1+2	1+2+4	1	K
d. A2	Be able to know the different components of PV system.	1+2	1+2+4	6	S
e. A3	Be able to know the Commissioning, Maintenance, and Troubleshooting	1+2+3	1+2+4	4	C
f. B	Intellectual skills:				
g. B1	Understand how can select the Off-Grid, On-Grid System Sizing	3+4	1+2+3	2	S
h. C	Subject-specific skills:				

i. C1	Be able to know the fundamentals of Site Surveys and Preplanning of PV projects.	1+2+3+4	1+2+3	3	K
j. D	Transferable skills:				
k. D1	Understand the calculation of solar radiation for different regional areas	1+2+3+4	1+2+3	5	S
l. D2	Be able to know PV system policies for different countries regulations	1+2+3+4	1+2	6	C

***Bloom Taxonomy Levels**

Level#	1	2	3	4	5	6
Level Name	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Evaluation**	**Synthesis**

**** Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.**

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (_____) program will demonstrate:	**Descriptors****		
	K	**S**	**C**

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			
8.				
9.				
10.				
11.				

**** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:
Interactive videos
Practice Labs
Discussion Forums
Quizzes
Other Interactive online activities
Integrative Projects
Reports

Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Activities (Course Videos, Practice labs, Discussion Forums, Quizzes)**_20__%**
- Midterm**_30__%**
- Final Exam **__50_%**

F- Available university services that support achievement in the course :**E-Learning Platform, Labs, Library.**

Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

Assessment Tools implemented in the course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Practice Labs
- Discussion Forums
- Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching
- Others:…….

Responsible Persons and their Signatures:

Course Coordinator	**Dr.Nour khlaifat**	**Completed Date**	**13/ 10/2022**
		Signature	

Received by (Department Head)		**Received Date**	/ /
		Signature	