COURSE Syllabus

Course Name: Energy Conversion and Storage.

Course Number: 4085171, 408491

General Course Information:

Course title	Energy Conversion and Storage.
Course number	4085171, 408491
Credit hours (theory, practical)	3 hours (theory)
Contact hours (theory, practical)	3 hours (theory)
Prerequisites/co-requisites	04083241
Academic Program	Renewable energy engineering
Program code	RE
Awarding institution	Isra University
Faculty	Engineering
Department	Renewable energy engineering
Level of course	4th
Academic year /semester	2022/2023 (1st S)
Awarded qualification	B.Sc
Other department(s) involved in teaching the course	-
Language of instruction	English
Date of production/revision	-

Course Coordinator:

Coordinator's Name: faten alsarayrah
Office No.: 3rd floor
Office Phone: 2502
Office Hours: Sun: [9:00-10:00], Mon: [11:00-12:00], Tue: [9:00-10:00], Wed: [11:00-12:00], Thu: [12:00-1:00]
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Other Instructors:

Instructor's Name:
Office No.:
Office Phone:
Office Hours:
Email:

Course Description:

The course provides the student with an overall understanding of Basic concepts of Energy classifications, sources and utilization. Growth in energy consumption and economics. Basic principles of the most important types of batteries used in renewable energy systems, including fixed and mobile battery applications. Overview of renewable energy sources, focusing on solar and wind energy systems. Introduction to dc conversion systems of energy (thermal and photovoltaic converters and geothermal and fuel cells). Energy storage.

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

M. Green, "Third generation Photovoltaics" Advanced Solar Energy Conversion", Springer 2006.

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

1. Required book (s), assigned reading and audio-visuals:K. Weston, Energy Conversion, EBook, http://www.personal.utulsa.edu/~kenneth-weston/.

Course Educational Objectives (CEOs):

1.	To introduce the students the renewable and non-renewable energy sources.
2.	Strengthen understanding of growth in energy consumption and his effect in the global and local economy.
3.	To introduce the students the renewable energy sources and focusing on solar and wind energy systems.
4.	To introduce the students the dc conversion systems of energy and focusing on thermal, photovoltaic, geothermal, and fuel cells energy systems.
5.	Strengthen understanding of basic principles of the most important types of storage batteries used in renewable energy systems including fixed and mobile battery applications.
6.	To introduce the students the energy storage concepts and types.

Intended Learning Outcomes (ILO's):

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	Intended Learning Outcomes (ILO's)	**Relationship to CEOs**	**Contribution to PLOs**
A	**Knowledge and Understanding:**		
A1	Ability to recognize renewable and non-renewable energy sources.		
B	**Intellectual skills:**		
B1	Ability to the understanding of growth in energy consumption and his effect in the global and local economy.		
C	**Subject specific skills:**		
C1	Knowledge of the operating principles of renewable energy production from various renewable sources, especially solar and wind energy systems.		
C2	Knowledge of operational requirements of direct conversion systems of energy and focusing on solar thermal, solar photovoltaic, geothermal, and fuel cells energy systems.		
D	**Transferable skills:**		
D1	Ability to strengthen understanding of basic principles of the most important types of storage batteries used in renewable		

	energy systems including fixed and mobile battery applications.		
D2	Knowledge of energy storage concepts and types.		

Topic Outline and Schedule:

Topic	Weeks	Achieved ILOs
Energy classifications.	1,2,	
Sources and utilization.	3	
Growth in energy.	4,5	
Overview of renewable energy sources.	6,7,8	
Mid exam	8	
Introduction to dc conversion systems of energy.	9,10	
Basic principles of the most important types of batteries used in renewable energy systems.	11,12	
Energy storage.	13,14,15	
Final exam	16	

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Lectures

Course Policies:

A- Attendance policies:

The maximum allowed absences are 15% of the lectures.

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

First Exam and second 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.

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

Required equipment:

Lap top, Data show.

Assessment Tools implemented in the course:

- ☐ First Written Exam.
- ☐ mid
- ☐ Final Written Exam.
- ☐ Quizzes.
- ☐ Homework.
- ☐ Integrative Projects.
- ☐ Case Study.
- ☐ Written Reports.
- ☐ Participation in Lecture.
- ☐ Practice in the Lab.
- ☐ Illustrative Presentations.
- ☐ Oral Exams.
- ☐ Others (identify):

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	
a.	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
b.	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
c.	An ability to communicate effectively with a range of audiences
d.	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
e.	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
f.	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
g.	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
h.	
i.	

Responsible Persons and their Signatures:

Course Coordinator	**Eng. Faten Alsarayrah**	**Completed Date**	
		Signature	

Received by (Department Head)	**Dr. Zakaria al omari**	**Received Date**	
		Signature	