



Course Specification

— (Bachelor)

Course Title: PHYSICS OF RENEWABLE ENERGIES
Course Code: 2034211-2
Program: Bachelor in Physics
Department: Physics
College: Science
Institution: Taif University
Version: 2 nd
Last Revision Date: 10/10/2023



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A. General information about the course:

1. Course Identification

1. Credit hours: (2)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (8th / 4th Year)

4. Course general Description:

The course aims to introduce a general engineering/science audience to the basic concepts of renewable energy. Basic concepts of renewable energy and non-renewable energy. The course covers the other type of energy solar energy, Ocean energy and Geothermal energy. The course links different type of energy to convert from type to another.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

This course aims at providing students with the systematic introduction to the concepts of modern photonics (the application and use of light in modern technologies) and subsystems for applications in optical communications, optical sensing and imaging, optical data-storage and computing and solid-state illumination.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning	--	--
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 	--	--
4	Distance learning	--	--

3. Contact Hours (based on the academic semester)





No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	State the basic concepts of renewable energy to practical aspects in today's life and recognize how those principles relate to forefront areas of research.	K1	Lecture	Written exam and Homework reports
1.2	Define and list the general different type of energy being used nowadays	K2	Lecture and Group discussion	Written exam
2.0	Skills			
2.1	Explain physical phenomena and concepts relevant to the course and their applications.	S1	Lectures	Written exam and Homework reports
2.2	Develop physics problems solving skills	S2	Lecture and Group discussion	Homework reports
3.0	Values, autonomy, and responsibility			
3.1	Show responsibility for working independently and for continuous improvement of personal capacities.	V1	Group discussion	Project
3.2				



C. Course Content

No	List of Topics	Contact Hours
1.	<p>Introduction</p> <ul style="list-style-type: none"> • Energy: Past, Today, and Future. A brief history of energy consumption. • Energy & Environment • Non-renewable energies 	6
2.	<p>Solar Energy</p> <ul style="list-style-type: none"> • Sun and its Energy: Basics of Solar Energy • Solar Energy in the Past • Solar Thermal Energy • Solar Photovoltaic 	6
3.	<p>Wind Energy</p> <ul style="list-style-type: none"> • Historical Background • Wind Resources • Wind Turbines • Environmental Impact 	6
4.	<p>Ocean Energy</p> <ul style="list-style-type: none"> • Ocean Energy Potential against Wind and Solar • Wave Characteristics and Statistics • Wave Energy Devices • Tide characteristics and Statistics • Tide Energy Technologies • Ocean Thermal Energy • Osmotic Power • Ocean Bio-mass 	6
5.	<p>Geothermal Energy</p> <ul style="list-style-type: none"> • Geothermal Resources • Geothermal Technologies 	4
6.	Final Review	2
7.	<p>Introduction</p> <ul style="list-style-type: none"> • Energy: Past, Today, and Future. A brief history of energy consumption. • Energy & Environment • Non-renewable energies 	6
8.	<p>Solar Energy</p> <ul style="list-style-type: none"> • Sun and its Energy: Basics of Solar Energy • Solar Energy in the Past • Solar Thermal Energy • Solar Photovoltaic 	6
9.	<p>Wind Energy</p> <ul style="list-style-type: none"> • Historical Background • Wind Resources • Wind Turbines • Environmental Impact 	6
10.	Ocean Energy	6





<ul style="list-style-type: none"> • Ocean Energy Potential against Wind and Solar • Wave Characteristics and Statistics • Wave Energy Devices • Tide characteristics and Statistics • Tide Energy Technologies • Ocean Thermal Energy • Osmotic Power • Ocean Bio-mass 	
Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Throughout Semester	20
2.	1 st Periodic Exam	7	15
3.	2 nd Periodic Exam	12	15
4.	Final Exam	16	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1- Renewable Energy Systems 1st Edition 2- by David M. Buchla 2011
Supportive References	Renewable Energy: Power for a Sustainable Future Third Edition by <u>Godfrey Boyle</u> 2011
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities	A classroom with movable tables and chairs conducive to group discussion and teamwork.
Technology equipment	Data show, smart board
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Student Feedback on Effectiveness of Teaching	Students	Indirect
Evaluation of Teaching	Peer reviewer Program coordinator Departmental council Faculty council	Indirect
Improvement of Teaching	Program coordinator Relevant committee	Direct
Quality of learning resources	Students Instructor Faculty	Indirect
Extent of achievement of course learning outcomes,	Program coordinator Instructor	Direct
Course effectiveness and planning for improvement	Program coordinator Instructor	Indirect
Student Feedback on Effectiveness of Teaching	Students	Indirect

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PHYSICS DEPARTMENT COUNCIL
REFERENCE NO.	NO. 4-45
DATE	27/09/2023 (12/03/1445)

