



Course Specifications

Course Title:	Physics of Renewable Energies
Course Code:	2034211-2
Program:	Bachelor in Physics
Department:	Physics Department
College:	College of Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 2
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 11 th level / 4 th year
4. Pre-requisites for this course (if any): NONE
5. Co-requisites for this course (if any): NONE

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended	0	0%
3	E-learning	0	0%
4	Distance learning	0	0%
5	Other	0	0%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	0
	Total	30

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>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.</p>
<p>2. Course Main Objective</p> <ul style="list-style-type: none"> • Basic concepts of renewable energy and non-renewable energy. • Solar energy. • Wind energy. • Ocean energy • Geothermal energy

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	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
1.2	Define and list the general different type of energy being used nowadays	K2
2	Skills :	
2.1	Explain physical phenomena and concepts relevant to the course and their applications.	S1
2.2	Develop physics problems solving skills	S2
3	Values:	
3.1	Show responsibility for working independently and for continuous improvement of personal capacities.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction <ul style="list-style-type: none"> • Energy: Past, Today, and Future. A brief history of energy consumption. • Energy & Environment • Non-renewable energies 	6
2	Solar Energy <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	Wind Energy <ul style="list-style-type: none"> • Historical Background • Wind Resources • Wind Turbines • Environmental Impact 	6
4	Ocean Energy <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	Geothermal Energy <ul style="list-style-type: none"> • Geothermal Resources • Geothermal Technologies 	4
	Final Review	2
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	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.	Lecture	Written exam and Homework reports
1.2	Define and list the general different type of energy being used nowadays	Lecture and Group discussion	Written exam
...			
2.0	Skills		
2.1	Explain physical phenomena and concepts relevant to the course and their applications.	Lectures	Written exam and Homework reports
2.2	Develop physics problems solving skills	Lecture and Group discussion	Homework reports
...			
3.0	Values		
3.1	Show responsibility for working independently and for continuous improvement of personal capacities.	Group discussion	Project

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Activities	Periodically	10%
2	Midterm exam	6 th	30%
3	Short exam	9 th	10%
4	Final exam	12 th	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

2 Hours per week during office-hours, in teacher's staffroom or as per the arrangement made by the teacher.

F. Learning Resources and Facilities

1. Learning Resources

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

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room with max 60 seats
Technology Resources (AV, data show, Smart Board, software, etc.)	data show, Smart Board, software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	NON

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation 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

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department Council / Committee of academic development
Reference No.	
Date	October 2, 2022