



Faculty: Engineering Technology	
Department: Energy	Program: Bachelor Degree
Academic year: 2021 - 2022	Semester: 1st (Fall)

Course Plan

First: Course Information

Course No. 0906353	Course Title: Renewable Energy Systems	Credit Hours:3
Prerequisite: 0906205	Section No.: 1	Lecture Time: 11-12,Sun,Tue,and Thu
Type Of Course:	<input type="checkbox"/> Obligatory Faculty Requirement Elective <input type="checkbox"/> University Requirement <input type="checkbox"/> Obligatory University Requirement <input type="checkbox"/> Faculty Requirement <input type="checkbox"/> Course Elective Specialty Requirement <input checked="" type="checkbox"/> Obligatory Specialty Requirement	
Type of Learning:	<input checked="" type="checkbox"/> Face-to-Face Learning <input type="checkbox"/> Blended Learning (2 Face-to-Face + 1 Asynchronous) <input type="checkbox"/> Online Learning (2 Synchronous+1 Asynchronous)	

Second: Instructor's Information

Name: Dr. Mais Alzgool		Academic Rank: Assistant Professor			
Office Number:136 l		Ext. Number:2039		E-mail: maisalzgool@yahoo.com	
Office Hours:	Sunday 9- 10	Monday 11-12	Tuesday 9 – 10	Wednesday 11 -12	Thursday 9 – 10

Third: Course Description

This course covers the Global electricity demand, Structure of the Electricity Supply Industry; Grid operation; supply and demand, conventional and renewable energy sources, availability of the energy sources in the world, how electricity is made and transmitted, fundamentals of solar photovoltaic technology and the PV cell performance, determination of the PV modules efficiency, PV System components for different types of designs, solar systems types, sizing the stand-alone PV system, commercial and institutional PV systems, solar concentrators, solar hot water systems, history of biomass technology, biomass sources and biomass energy process, fundamentals of biomass combustion, introduction to geothermal energy and the principle of geothermal reservoirs, types of geothermal sources, types of hydrothermal resources, geothermal power production systems (analysis and operation), geothermal heat pumps, types of hydropower turbines, potential energy stored in the reservoir, introduction to nuclear energy and its operation principles, nuclear power plant components, wind turbine components, the power in the wind.

Fourth: Learning Source

Main Reference:	Introduction-to-Renewable-Energy, , New Mexico State University, by Taylor & Francis Group, LLC.	
Author: Vaughn Nelson	Issue No.:	Publication Year: 2011
Additional Sources & Websites:	<ul style="list-style-type: none"> • • 	
Teaching Type:	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input type="checkbox"/> MS Teams <input type="checkbox"/> Moodle	

Fifth: Learning Outcomes

Course Code	Course Intended Learning Outcomes (CILOs)	Connection To Program ILOs Code
Knowledge		
**K1	Study the availability of the energy sources in the world and how electricity is made and transmitted.	*PK1
K2	Study the concept of various renewable energy sources and its power conversion process.	PK2
K3	Understand the fundamentals of the available renewable energy sources such as; solar, geothermal, hydro and wind.	PK3
Skills		
***S1	Analyze the nuclear energy and its operation principles with the nuclear power plant components.	PS1
S2	Explain the types of hydropower turbines and the potential energy stored in the reservoirs.	PS2
S3	Explain geothermal energy and the principle of geothermal reservoirs with the types of geothermal sources available.	PS3
S4	the biomass technology, biomass sources and biomass energy process, and also the fundamentals of biomass combustion process.	PS4
S5	Explain the fundamentals of solar photovoltaic technology and the PV cell performance.	PS5
Competencies		
****C1	the wind energy, wind turbine components and calculation of the power in the wind.	PC1
C2	Determination of the PV modules efficiency, PV System components for different types of designs.	PC2

* P: Program, **K: knowledge, ***S: skills, ****C: competencies.

Sixth: Course Structure

Lecture Date	Intended Teaching Outcomes(ILOs)	Topics	Teaching Procedures*	TeachingMethods***	References***
3/6/2022	0	Global electricity demand, Structure of the Electricity Supply Industry; Grid operation; supply and demand	General discussions	Discussion and problem Solving	Energy Engineering
8/3/2022	1	Global electricity demand, Structure of the Electricity Supply Industry; Grid operation; supply and demand	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
10/3/2022	1	Conventional and renewable energy sources, availability of the energy sources in the world, how electricity is made and transmitted	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
13/3/2022	1	Conventional and renewable energy sources, availability of the energy sources in the world, how electricity is made and transmitted	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
15/3/2022	2	Fundamentals of solar photovoltaic technology and the PV cell performance	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
17/3/2022	1 & 2	Fundamentals of solar photovoltaic technology and the PV cell performance	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
20/3/2022	3	Determination of the PV modules	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

		efficiency, PV System components for different types of designs			
22/3/2022	3	Determination of the PV modules efficiency, PV System components for different types of designs	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
24/3/2022	3	Solar systems types, sizing the stand-alone PV system, commercial and institutional PV systems	General discussions	Discussion and problem Solving	Energy Engineering
27/3/2022	3	Solar systems types, sizing the stand-alone PV system, commercial and institutional PV systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
29/3/2022	3	Other Factors Affecting Performance (PV parameters)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
31/3/2022	4	Calculation of Unit Cost of PV Panels	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
3/4/2022	3 & 4	Sizing the stand-alone system	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
5/4/2022	3 & 4	Sizing the stand-alone system	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
7/4/2022	4	Grid-Tie PV Solar Power Systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
10/4/2022	5	Grid-Tie PV Solar Power Systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
12/4/2022	5	Solar concentrators and solar hot water systems	General discussions	Discussion and problem Solving	Energy Engineering
14/4/2022	5	Solar concentrators	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

		and solar hot water systems			
17/4/2022	5	Solar concentrators and solar hot water systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
19/4/2022	5	History of biomass technology, biomass sources and biomass energy process.	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
21/4/2022	4	History of biomass technology, biomass sources and biomass energy process.	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
26/4/2022	3 & 4	fundamentals of biomass combustion	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
28/4/2022	6	Introduction to geothermal energy and the principle of geothermal reservoirs, types of geothermal sources	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
8/5/2022	4	Introduction to geothermal energy and the principle of geothermal reservoirs, types of geothermal sources	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
10/5/2022	3 & 4	Geothermal power plants	General discussions	Discussion and problem Solving	Energy Engineering
12/5/2022	3 & 4	Types of hydrothermal resources, geothermal power production systems (analysis and operation)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
15/5/2022	4	Geothermal heat pumps	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
17/5/2022	6	Geothermal heat pumps	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
19/5/2022	4	Introduction to hydropower	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering

		turbines and potential energy			
22/5/2022	6	Introduction to hydropower turbines and potential energy	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
24/5/2022	4	Tidal power And its exploitation methods	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
26/5/2022	7	Types of hydropower turbines and potential energy stored in the reservoirs	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
29/5/2022	8 , 9 , 10	Introduction to nuclear energy and its operation principles	General discussions	Discussion and problem Solving	Energy Engineering
31/5/2022	8 , 9 , 10	Introduction to nuclear energy and its operation principles	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
2/6/2022	8 , 9 , 10	Nuclear power plant components	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
5/6/2022	8 , 9 , 10	History of the wind power	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
7/6/2022	10	The wind and its potential	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
9/6/2022	10	Wind turbine components and its working principles	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

* Learning procedures: (Face-to-Face, synchronous, asynchronous). ** Teaching methods: (Lecture, video.....). *** Reference: (Pages of the book, recorded lecture, video.....).

Seventh: Assessment methods

Methods	Grade	Date	Platform	CLO'S
First Exam	20	Fixed by the Department	Classroom	
Second Exam	20	Fixed by the Department	Classroom	
Assign, Quizzes & Participation	10	During Semester	Classroom+Moodle	
Final Exam	50	Fixed by the Department	Classroom	

Eighth: Course Policies

- All course policies are applied on all teaching patterns (online, blended, and face-to-face Learning) as follows:
 - a. Punctuality.
 - b. Participation and interaction.
 - c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approved by:	Name	Date	Signature
Head of Department	Dr. Ayman Amer	10/3/2022	
Faculty Dean	Prof .Taiseer Alghanim	10/3/2022	