Faculty: Engineering Technology	
Department: Energy	**Program: Bachelor Degree**
Academic year: 2024-2025	**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: 9-10,Sun,Tue,and Thu***
Type Of Course:	☐ ***Obligatory Faculty Requirement Elective*** ☐ ***University Requirement*** ☐ ***ObligatoryUniversity Requirement*** ☐ ***FacultyRequirement*** ☐ ***Course Elective SpecialtyRequirementObligatorySpecialization requirement*** ☒	
Type of Learning:	☒ ***Face-to-Face Learning*** ☐ ***BlendedLearning(2 Face-to-Face + 1Asynchronous)*** ☐ ***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***	***Monday***	***Tuesday***	***Wednesday***	***Thursday***
	1-2	***12-1***	***1-2***	***12-1***	***1-2***

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:	• •	
Teaching Type:	☒ ***Classroom*** ☐ ***Laboratory*** ☐ ***Workshop*** ☐ ***MS Teams*** ☐ ***Moodle***	

Fifth: Learning Outcomes

Course Code	***Course IntendedLearning Outcomes (CILOs)***	***Connection To Program ILOs Code***
Knowledge		
**K1	**Introduce** the availability of conventional and renewable energy sources in the world	*PK1
K2	**Identify** the fundamentals of solar photovoltaic technology and PV cell performance.	PK2
K3	**Explain** the fundamentals of biomass technology, biomass sources, and also understanding the fundamentals of the nuclear reactor and nuclear power plant components.	PK3
Skills		
***S1	**Demonstrate** the PV modules efficiency, and PV System components for different designs	PS1
S2	**Analyze** different types of hydropower turbines and geothermal reservoirs to calculate the potential energy of these reservoirs.	PS2
S3	**Analyze** the power in the wind, wind turbine components, and calculation of the electrical output power of the wind turbine.	PS3
Competencies		
****C1	**Apply** the main concepts of studying the availability of renewable energy sources in a location to evaluate their potential.	PC1

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

Sixth: Course Structure

Lecture Date	Intended Teaching Outcomes(ILOs)	Topics	Teaching Procedures*	TeachingMethods***	References***
13/10/2024	A1	Global electricity demand, Structure of the Electricity Supply Industry; Grid operation; supply and demand	General discussions	Discussion and problem Solving	Energy Engineering
15/10/2024	A1	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
17/10/2024	A2	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
20/10/2024	A2, B1	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
22/10/2024	A2, B1, C1	Conventional and renewable energy sources, availability of the energy sources in the world, how electricity is made and transmitted	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
24/10/2024	A2 , B1	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
27/10/2024	A2 , B1, C1	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
29/10/2024	A2 , B1, C1	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
31/10/2024	A4 , B1, C1	Fundamentals of solar photovoltaic technology and the PV cell performance	General discussions	Discussion and problem Solving	Energy Engineering

3/11/2024	A2, B2	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
5/11/2024	A2, B2, C1	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
7/11/2024	A2, B2, C1	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
10/11/2024	A3, B3, C1	Solar systems types, sizing the stand-alone PV system, commercial and institutional PV systems	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
12/11/2024	A2, B2	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
14/11/2024	A2, B2, C1	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
17/11/2024	A2, B2, C1	Calculation of Unit Cost of PV Panels	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
19/11/2024	A3, B3, C1	Calculation of Unit Cost of PV Panels	General discussions	Discussion and problem Solving	Energy Engineering
21/11/2024	A2, B2	Calculation of Unit Cost of PV Panels	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
24/11/2024	A2, B2, C1	Sizing the stand-alone system	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
26/11/2024	A2, B2, C1	Sizing the stand-alone system	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
28/11/2024	A3, B3, C1	Sizing the stand-alone system	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
1/12/2024	A2, B2	Grid-Tie PV Solar Power Systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
3/12/2024	A2, B2, C1	Grid-Tie PV Solar Power Systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

5/11/2024	A2, B2	Solar concentrators and solar hot water systems	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
8/11/2024	A2, B2, C1	Biomass technology, biomass sources, and biomass energy process.	General discussions	Discussion and problem Solving	Energy Engineering
10/12/2024	A2, B2, C1	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
12/112/2024	A3, B3, C1	Geothermal power plants and heat pumps	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
15/12/2024	A2, B2	Hydropower turbines and potential energy	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
17/12/2024	A2, B2, C1	Nuclear energy and its operation principles/ Wind power	At least one exam will be held suddenly during the semester	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	20/11/2024	
Faculty Dean	Prof .Taiseer Alghanim	20/11/2024