



Electrical and Renewable Energy Engineering Program

Course Specification - (2025-2026)

Renewable Energy and Buildings – ERE377

Academic Year	2025/2026	Semester	Fall
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1. Basic Information

Course Title (according to the bylaw)	Renewable Energy and Buildings				
Course Code (according to the bylaw)	ERE377				
Prerequisite:	Solar Energy (ERE314), Wind Energy (ERE315), Biomass and waste Conversion Technology (ERE323)				
Department/s participating in delivery of the course	Electrical and Renewable Energy Engineering				
Number of credit hours/points of the course (according to the bylaw)	Credit Hours	Contact Hours			
		Lecture	Tutorial	Practical	Total
		3	2	0	4
Course Type	Elective - Minor Requirements of Electrical and Renewable Energy Engineering				
Academic level at which the course is taught	Fifth Level				
Academic Program	Bachelor of Engineering of Electrical and Renewable Energy				
Faculty/Institute	Faculty of Engineering				
University/Academy	Nahda University				
Name of Course Coordinator	Assoc. Prof. Dr. Amir Yassin				
Course Specification Approval:	Department council		Faculty council		
Date of Approval of the course Specification:	13 / 9 / 2025		16 / 9 / 2025		



2. Course Overview

This course introduces renewable energy systems. It covers the fundamental concepts of energy and radiation with specific solar energy applications and photovoltaic, electrical energy storage systems, and thermal energy and storage. The second part covers the basic science of wind energy systems and their electrical system designs. The third part covers the bioenergy systems from resources to final products and conversion technologies. It finally introduces other promising energy sources.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
B3	Design and implement: elements, modules, sub-systems or systems in electrical / electronic / digital engineering using technological and professional tools.	CLO1	Recognize characteristics of different types of renewable energy systems
		CLO2	Analyze the performance and the characteristics of recently renewable energy resources
		CLO3	Discuss the operations of renewable energy resources.
B5	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.	CLO1	Recognize characteristics of different types of renewable energy systems
		CLO2	Analyze the performance and the characteristics of recently renewable energy resources
		CLO3	Discuss the operations of renewable energy resources.
		CLO4	Discuss the operations of future promising renewable energy systems.
D1	Model, analyze and design physical systems applicable to the specific discipline by	CLO2	Analyze the performance and the characteristics of recently renewable energy resources



Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.	CLO3	Discuss the operations of renewable energy resources.
		CLO4	Discuss the operations of future promising renewable energy systems.
D2	Identify, analyze and evaluate the energy's conversion processes and management techniques;	CLO2	Analyze the performance and the characteristics of recently renewable energy resources
		CLO3	Discuss the operations of renewable energy resources.
		CLO4	Discuss the operations of future promising renewable energy systems.
		CLO5	Gain access to data and information from libraries and internet related to course subjects.
D3	Model, analyze, design, implement, test and operate renewable energy systems such as solar photovoltaics, solar thermal, wind, biomass and waste, hydro-tidal and wave, and other renewable energy applications.	CLO1	Recognize characteristics of different types of renewable energy systems
		CLO2	Analyze the performance and the characteristics of recently renewable energy resources
		CLO3	Discuss the operations of renewable energy resources.
		CLO4	Discuss the operations of future promising renewable energy systems.
		CLO5	Gain access to data and information from libraries and internet related to course subjects.

4. Teaching and Learning Methods

1. Interactive Lectures
2. Tutorials
3. Self-Learning
4. Case study
5. Report and research



Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours				
			Lecture Hours	Tutorial Hours	Practical Hours	Self-learning (Ass/ Project)	Other
1	Introduction to renewable energy systems.	6	2	2	0	2	-
2	Fundamental and concepts of solar energy	6	2	2	0	2	-
3	Solar energy applications and photovoltaic,	6	2	2	0	2	-
4	Electrical energy storage systems.	6	2	2	0	2	-
5	Solar electrical system design.	8	2	2	0	2	Quiz 1 (2 Hr)
6	Thermal energy and storage.	6	2	2	0	2	-
7	Introduction to the basic science of wind energy systems						
8	First Mid-Term Exam	6	2	2	0	2	-
9	Wind electrical system design.	6	2	2	0	2	-
10	Wind electrical system design.	8	2	2	0	2	Quiz 2 (2 Hr)
11	Introduction to the bioenergy systems from resources to final products and conversion technologies.	6	2	2	0	2	-
12	Introduction to the bioenergy systems from resources to final products and conversion technologies.	6	2	2	0	2	-
13	Introduction to other promising energy sources such as Wave Energy	6	2	2	0	2	
14	Introduction to other promising energy sources such as Tidal Energy.	6	2	2	0	2	-
15	Revision	6	2	2	0	2	-
16	Final Term Exam						

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Mid-term written Exam	7	20	20%
2	Final Written Exam	16	40	40%
3	Assignments	2-14	10	10%
4	Quizzes	5,10	20	20%
5	Report	12	10	10%



6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course	1) Duffie and Beckman (1991), Solar engineering of thermal processes 2nd Ed., Wiley. 2) Yogi Goswami (2015), Principles of Solar Engineering, CRC Press.
	Other References	1) Reddy (1987), The design and sizing of active solar thermal systems, Clarendon. 2) Lunde (1980), Solar thermal engineering: space heating and hot water systems, Wiley. 3) Yogi Goswami (2015), Principles of Solar Engineering, CRC Press.
	Electronic Sources	www.ekb.eg
	Learning Platforms	https://lms.nub.edu.eg/login/index.php
Supportive facilities & equipment for teaching and learning	Devices/Instruments	Data Show
	Supplies	White Board
	Electronic Programs	—
	Skill Labs/ Simulators	MATLAB Simulink Software Programs
	Virtual Labs	—
	Other (to be mentioned)	Lecture Hall and Laboratory Usage

Assoc. Prof. Dr. Amir Yassin
Course Coordinator

Dr. Mohamed Kourany Saad
Program Coordinator