

Faculty of Engineering & Technology

Energy Conversion Systems

Information :

Course Code :	MPR 555	Level	:	Undergraduate	Course Hours :	3.00- Hours

Department : Specialization of Mechatronics Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Anas Mohamed Abdelrahman Ali	3
Lecturer	Anas Mohamed Abdelrahman Ali	3
Assistant Lecturer	Moustafa Raafat Aziz Shousha	1
Teaching Assistant	Ahmed Ibrahim Sadek Mostafa Elgindy	

Area Of Study :

This course aims to:

ÄEnrich the student knowledge about energy resources, crises and future.

* A Prepare the student to apply fundamentals principles of Mechanical energy generation systems.

["]ÁDevelop student skills for analyzing energy conversion systems."

A rain the student to explore the fundamentals of energy conversion using Re-newable sources.

A rain the student to share ideas and search for novel ideas and solutions.

Description:

The world energy crises from engineering perspective; Energy resources, reserves and environmental impacts. Principles and technologies of conventional energy conversion systems; fossil fuels plants, nuclear power and hydro power systems. Potential and characteristics of renewable energy systems; solar thermal power, photovoltaics, wind energy, sea water and OTEC systems, geothermal plants, biomass and fuel cells. Development of energy storage technologies.

Course outcomes :

a.Knowledge and Understanding: :

1 -	Identify engineering economy, legislation, business and management techniques and practices appropriate to energy conversion systems.		
2 -	Demonstrate knowledge of basic components of conventional energy conversion systems and related engineering contemporary issues.		
3 -	Describe most successful and promising conventional and renewable energy conversion systems.		
4 -	Identify principles in the field of fluid flow, thermodynamics, gas dynamics, turbo-machinery, heat transfer engineering and fundamentals of thermal and fluid processes.		
5 -	Recognize performance concerns of mechanical components, in the field of power producing systems.		
6 -	Identify basic parameters and engineering principles governing ener-gy conversion processes.		
b.Intellectual Skills: :			
4	Analyze the colution alternatives to choose the active or one		

1 - Analyze the solution alternatives to choose the optimum one.



2 -	Analyze the performance of the basic types of thermal power systems, hydraulic systems and renewable power systems.		
3 -	Derive different solution alternatives for the engineering problems of conventional and renewable energy systems based on analyzing and interpreting data and evaluating the power losses in these systems.		
4 -	Evaluate designs, processes, and performance of energy conversion systems and propose improvements.		
c.Professional and Practical Skills: :			
1 -	Analyze the record data in the laboratory.		
2 -	Use laboratory, workshop equipment and field devices competently and safely.		
d.General and Transferable Skills: :			
1 -	Use digital libraries and/or Learning systems and demonstrate effi-cient IT capabilities.		
2 -	Share and motivate individuals and work with others according to the rules of the professional Ethics.		
3 -	Share ideas, communicate effectively and work in stressful environ-ment and within constraints.		

4 - Collaborate effectively within multidisciplinary team.

Course Topic And Contents :

Торіс	No. of hours	Lecture	Tutorial / Practical
Introduction and course outlines	4	2	2
Conventional energy conversion systems-I	8	4	4
Nuclear energy conversion systems	4	2	2
Hydro energy conversion systems-IV : +Mid-term Examination	8	4	4
Renewable energy conversion systems-I: Wind Turbines	4	2	2
Renewable energy conversion systems-II: Tidal & Wave	4	2	2
Renewable energy conversion-III: OTEC and Geothermal	4	2	2
Solar thermal-non concentrating systems	6	2	4
Solar thermal-concentrating systems	6	2	4
Solar Photovoltaic energy conversion	4	2	2
Energy storage systems, Bio mass and fuel cells	6	4	2
Term Research presentation	2	2	

Teaching And Learning Methodologies :		
Interactive Lecture		
Problem based learning		
Discussion		
Experimental learning		
Project based learning		
Search		



Course Assessment :				
Methods of assessment	Relative weight %	Week No	Assess What	
Assignment	10.00	12		
Final Exam	40.00	16	Written	
Mid- Exam I	15.00	6	written exam	
Oral Exam	5.00	16		
Participation	10.00	15	Activities, participation and discipline	
Quizzes	5.00	3	Follow up during the course & written exam	
Term Project	15.00	11	Reports, follow up during tut. /lab work.	

Recommended books :

Energy Conversion Systems, Harry A. Sorensen John Wiley& sons , 1983