Jadara University جامعة جدارا

COURSE DESCRIPTIONS

Faculty	Engineering				
Department	Renewable Energy Engineering			NQF level	7
Course Title	Energy Resources	**Code**	703539	**Prerequisite**	703434
Credit Hours	3	**Theory**	Theory	**Practical**	none
Course Leader	Dr. Jamal Alsadi	**email**	j.alsadi@jadara.edu.jo		
Lecturers	Dr. Amer Al-Canaan	**emails**	a.alcanaan@jadara.edu.jo		
Lecture time	11:00-12:15	**Classroom**		**Attendance**	On campus
Semester	Summer 2021/2022	**Production**	2021	**Updated**	2022

Short Description

This course will cover the types of most common conventional fuels and the basic principles to energy. Survey of energy technologies including: biomass energy, biofuels and fuel cells. Topics in this course include understanding the uses of Geothermal Energy in Heating, cooling, generating electricity, hydroelectric, nuclear, solar and wind energy, Heat transfer and energy conversion, solar radiation energy and thermal technologies including: wind energy and Nuclear energy. The course also provides an overview of solar thermal technologies and characteristics of sunlight, PV photovoltaic systems.

Course Objectives

1. Get acquainted with the various sources of energy: hydrocarbon, nuclear, solar, biomass, geothermal, tidal, ..etc.
2. Gain understanding of the physical principles underlying energy production, storage, transport and usage.
3. Understand the operation of the direct generating energy methods such as wind energy, solar and nuclear.
4. Describe energy sources and maximise available energy.
5. Gain ability to recognise ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.

Learning Outcomes

A. Knowledge - Theoretical Understanding

a.1 Learn/understand the basic characteristics of energy resources and their units. (K1)

B. Knowledge - Practical Application

a.2 Compare between different energy resources in terms of several criteria including applications, conversion efficiency, cost, storage, technology and efficiency. (K2)
C. Skills - Generic Problem Solving and Analytical Skills
b.1 Calculate various quantities related to energy conversion, power consumption and other values related to energy resources. (S1)
D. Skills - Communication, ICT, and Numeracy
b.3 Conduct group work, **write** technical reports related to energy resources and perform oral presentations. (S3)
E. Competence: Autonomy, Responsibility, and Context
Teaching and Learning Methods
E-learning (Blackboard), Engaged learning, Problem based learning (PBL), and Project based learning:
Assessment Methods
Class Participation and Assignments
Term Project/Presentation
HW
Quizzes
Midterm Exam
Final Exam

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1.	5	a1	1-1-Principles of energy resources, Energy classification, 1-2 introductions	Lectures, presentations	
2.	5	a1	2-2-Energy Basics, resources of non-renewable energy Basic Thermal Energy Heat transfer	Lectures, presentations	
3.	4.5	a2, b1, b3	Fossil Fuels Hydrogen, fuel cells, batteries, super capacitors,	Lectures, presentations	**Group work #1**

			and hybrids		**Quiz #1**
4.	4	a1, a2, b1	Oil shale Forms of Energy Energy Conversion **Midterm exam**	Lectures, presentations	**Midterm exam**
5.	4.5	a1, a2, b1	Solar energy	Lectures, presentations	**Quiz #2**
6.	5	a1, a2, b1, b3	wind energy Fuel cell	Lectures, presentations	**Group work #2**
7.	5	a1, a2, b1	Energy storage	Lectures, presentations	
8.	2	a1, a2, b1	Energy storage Review **Final Exam**	Lectures	**Final exam**

Infrastructure	
Textbook	1. Renewable Energy Resources, John Twidell and Tony Weir, 3rd edition, 2015, ISBN 9781315766416. 2. Understanding Renewable Energy Systems, Volker Quaschning, 2nd edition, 2016, ISBN: 9781315769431
References	☐ Introduction to Nuclear Engineering, John R. Lamarsh and Anthony J. Baratta, Third edition, Prentice-Hall, Inc., 2011 ☐ Reactor Physics, IAEA 2004 ■ http://www-ns.iaea.org/tutorials/reactor-physics/chapitres/chapters.pdf ☐ Fusion ■ http://www-pub.iaea.org/books/iaeabooks/8879/Fusion-Physics ☐ Additional Reference: ■ http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-of.html

Required reading	Energy Economics: Concepts, Issues, Markets and Governance by Bhattacharyya, Subhes C
Electronic materials	BB learn presentation and handout
Other	

Course Assessment Plan						
Assessment Method		**Grade**	**CLOs**			
			a1	**a2**	**b1**	**b3**
First (Midterm)		**30%**	10	12	8	
Second (if applicable)						
Final Exam		**50%**	11	11	17	11
Coursework		**20%**				
Coursework assessment methods	Assignments					
	Case study					
	Discussion and interaction					
	Group work activities					
	Lab tests and assignments					
	Presentations/report					10
	Quizzes		5		5	
Total		**100%**	**26**	**22**	**30**	**21**

Plagiarism
Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code). Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.