

Zarqa University

Faculty of Engineering Technology  
Department: Energy Engineering  
Course title:  
**Energy and Environment**



Prerequisite: Wind energy  
Instructor: TBD  
Lecture's time: TBD  
Semester: TBD  
Office Hours: TBD

### Course description:

This course covers Energy fundamentals and energy use, Energy systems and environment, Fossil fuels, conventional and renewable energy sources, the impact of RE in reducing CO2 emissions, Consequence of pollution growth; air, soil, thermal, cause and effect causes of global, regional and local climate change; pollution control methods, environmental laws on pollution control, Global warming, greenhouse gas emissions, ozone depletion, impacts sustainability, transportation and EV, The effect of future energy systems.

### Aims of the course:

1. The global electricity demand and the energy use in industrial society.
2. The main principle of energy conservation.
3. Study the fossil fuels (oil, coal and gas) formation processes and its impact on the environment.
4. Study the global warming and climate change problem.
5. Air pollution; causes and effects.
6. Study the future of the energy systems and how to rely on renewable energy sources to reduce the environmental problems.
7. The applications of renewable energy sources in our society.

### Intended Learning Outcomes (ILOs):

1. Understand the importance of the energy use in industrial society.
2. Explain the principle of energy conservation.
3. Understand the fossil fuels formation processes and its impact on the environment.
4. Explain how the fossil fuel resource presents a broad range of complex problems and potentialities.
5. Explain the effects and causes of Global warming.
6. Determine the problems of the Air pollution.
7. Explore different applications to reduce the use of the conventional energy sources such as electric vehicles.



## Course structures:

Day	C. hrs	ILO	Topic(s)	Teaching Procedure *	Learning Activities **	Learning Platform
Sun 21/2/2021	1	1	Introduction to Energy Fundamentals, Energy use in an industrial society	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 23/2/2021	1	1	Introduction to Energy Fundamentals, Energy use in an industrial society	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 25/2/2021	1	1, 2	Energy basics and energy forms	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 28/2/2021	1	1, 2	Energy basics and energy forms and Energy units	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 2/3/2021	1	1, 2	Energy Conservation and Higher Efficiency	Interactive lectures, using PPT slides/class notes, digital pen	lecturing, discussion, problem solving.	Teams & Moodle
Thu 4/2/2021	1	1, 2	Energy Consumption in the United States	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 7/3/2021	1	1, 2	The Principle of Energy Conservation and Transformation of Energy from One Form to Another	Interactive lectures, using PPT slides/class notes, digital pen.	<b>Quiz 1</b>	Teams & Moodle
Tue 9/3/2021	1	1, 2	Introduction to Renewable and Non-renewable Energy Sources	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 11/3/2021	1	1, 2	Introduction to The Fossil Fuels	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 14/3/2021	1	1, 2	History of the Production of Petroleum in the United States	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 16/3/2021	1	3	Petroleum Resources of the United States	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle



Day	C. hrs	ILO	Topic(s)	Teaching Procedure *	Learning Activities **	Learning Platform
Thu 18/3/2021	1	3	World Production of Petroleum and The Cost of Gasoline in the United States	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 21/3/2021	1	3	Petroleum Refining	Interactive lectures, using PPT slides/class notes, digital pen.	<b>Quiz 2</b>	Teams & Moodle
Tue 23/3/2021	1	3	The History of Use of Natural Gas	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 25/3/2021	1	3	The Natural Gas Resource Base in the United States and the world	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 28/3/2021	1	4	The Formation of Coal	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 30/3/2021	1	4	Coal Resources and Consumption	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 1/4/2021	1	4	Shale Oil	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 4/4/2021	1	4	Tar Sands	Interactive lectures, using PPT slides/class notes, digital pen.	<b>Quiz 3</b>	Teams & Moodle
Tue 6/4/2021	1	4	The Earth's Atmosphere	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 8/4/2021	1	5	Air Pollution	Interactive lectures, using PPT slides/class notes, digital pen.	Student presenting role	Teams & Moodle
Sun 11/4/2021	1	5	Thermal Inversions	Interactive lectures, using PPT slides/class notes, digital pen.	Student presenting role	Teams & Moodle
Tue 13/4/2021	1	5	Carbon Monoxide	Interactive lectures, using PPT slides/class notes, digital pen.	Student presenting role	Teams & Moodle
Thu 15/4/2021	1	5	The Oxides of Nitrogen	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle

Day	C. hrs	ILO	Topic(s)	Teaching Procedure *	Learning Activities **	Learning Platform
<b>Sun 18/4/2021</b>	1		<b>Mid Exam</b>		<b>Mark: 35%</b>	Online Exam system
Tue 20/4/2021	1	5	Hydrocarbon Emissions and Photochemical Smog	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 22/4/2021	1	5	Reduction of Vehicle Emissions	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 25/4/2021	1	5	Sulfur Dioxide in the Atmosphere	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 27/4/2021	1	5	Particulates as Pollutants	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 29/4/2021	1	5	Acid Rain	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 2/5/2021	1	5,6	Introduction to Global Effects	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 4/5/2021	1	5,6	Ozone Depletion in the Stratosphere	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 6/5/2021	1	5,6	The Greenhouse Effect and World Climate Changes	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 9/5/2021	1	5,6	The Greenhouse Effect and World Climate Changes	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 11/5/2021	1	5,6	Introduction to the importance of transportations sector	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
<b>Thu 13/5/2021</b>			<b>Eid Al Fitter (expected)</b>			



Day	C. hrs	ILO	Topic(s)	Teaching Procedure *	Learning Activities **	Learning Platform
Sun 16/5/2021	1	7	Power and Energy Requirements in transportation sector	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 18/5/2021	1	7	Power and Energy Requirements in transportation sector	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 20/5/2021	1	7	The problems caused by a transportation system	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 23/5/2021	1	7	The forces and power required for a vehicle	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
<b>Tue 25/5/2021</b>			<b>Independence anniversary</b>			
Thu 27/5/2021	1	7	The forces and power required for a vehicle	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Sun 30/5/2021	1	7	Electric Vehicles	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Tue 1/6/2021	1	7	Electric Vehicles	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
Thu 3/6/2021	1		Review and discussion.	Interactive lectures, using PPT slides/class notes, digital pen.	lecturing, discussion, problem solving.	Teams & Moodle
<b>TBD</b>	1		<b>Final Exam</b>		<b>Mark: 50%</b>	Online Exam system
<b>Total</b>	<b>46</b>					

**Textbook:**

Textbook: Energy and the Environment”, R. A. Ristinen, J.J. Kraushaar  
2nd Edition, 2006.

**Supplementary Textbook/ Material(s):**

- PPT slides on Moodle
- Energy, the Environment, and Sustainability, Efstathios E. Michaelides, May 9, 2018 by CRC Press.

Equipment: Internet Connection, Laptops, and Webcams

**Assessment Methods:**

Method	Grade	Date	Platform	Assignment
Midterm Exam	%35	Fixed by the Department	Moodle/Online Exam system	
Participation, Presentation, Attendance...etc	%15	During Semester	Moodle	<b>Average of quizzes/assignments</b>
Final Exam	%50	Fixed by the Department	Moodle/Online Exam system	

