Zarqa University

Faculty of Engineering
Department: Energy
Course title: Biomass Energy System

Prerequisite:
Instructor: Dr Aktham Yasin
Lecture's time: Sun –Tue- Th.
Semester: 1
Office Hours: 11:00 – 12:00 , 9:30-11:00

Course description:

Energy Economics and Management 0906532

Biomass Energy System 0906532
This course will introduce a range of biomass energy sources, including forestry, wastes and crops, as well as various technologies for capturing the stored chemical energy in biomass: direct combustion, pyrolysis , anaerobic digestion, gasification, fermentation, landfill gas and cogeneration.

Course learning out comes (CLOs):

1- Ability to know the sources of energy
2- Ability to know the types of energy
3- Ability to know the different between Renewable Energy and non Renewable Energy and make the comparison between them
4- Ability to know the different types of technologies for capturing energy from biomass
5- Ability to know the advantages and disadvantages of each one of the technologies including the processing and make the comparison between them.
6- Ability to know how to make the choice and the decision about which types of technology to bring it in consideration and how you develop it.
7- Ability on how to save the atmosphere of the earth and keep suitable to live in a healthy environment

Course structures:

#Topic	Topic	Ref. in the Text	Lect.	CLO	Teaching Procedure
1	**Introduction to Thermochemical Processing of Biomass into Fuels, Chemicals, and Power**	**CH. 1**	**6 Hrs**	**1, 2**	Data show lecture and mention examples
2	**Direct Combustion**	**CH. 2**	**6 Hrs**	**2, 3**	Data show lecture and mention examples
3	**Gasification**	**CH. 3**	**6 Hrs**	**4, 5**	Data show lecture and mention examples
4	**Pyrolysis**	**CH. 4**	**6 Hrs**	**4, 5**	Data show lecture and mention examples
5	**Hydrothermal processing**	**CH. 5**	**6 Hrs**	**4, 5**	Data show lecture and mention examples
6	**Anaerobic digestion**	**CH. 6**	**6 Hrs**	**4, 5, 6**	Data show lecture and mention examples
7	**Fermentation**	**CH. 7**	**6 Hrs**	**4, 5, 6**	Data show lecture and mention examples
8	**Landfill gas and cogeneration**	**CH. 8**	**3**	**4, 5, 6, 7**	Data show lecture and mention examples
9	**Review of the total course**				

Textbook:

- **Thermochemical Processing of Biomass: Conversion into fuels, Chemicals and Power, Robert C. Brown , 1st edition, John Wiley & sons, Ltd, 2011.**

References:

- **Biomass to Renewable Energy Processes, Jay Cheng, 1st edition, CRC Press Taylor and Francis Group,LLC, 2010.**
- **Technologies for Converting Biomass to Useful Energy, 1st edition, CRC Press Taylor and Francis Group, London, UK, 2013**

Assessment Methods:

Methods	Grade	Date
Test 1	20	
Test 2	20	
Quizes	10	
Final Exam	50	