Course Specifications

Program(s) on which the course is given : P., P.&las., P.&comp.
Major or minor element of program: : minor -minor - major .
Department offering the program: : P., P., P.&Math.
Department offering the course: Physics
Academic year / Level: 4
Date of specification approval: 2012

A- Basic Information

Title: Renewable Energies Code: P4914

Credit Hours: 2 Lecture: 2h
Tutorial: 0 Practical: 0
Total: 2h

B- Professional Information

1 – Overall aims of course

Upon successful completion of this course, students should be able to understand the basics of different renewable energy resources and the mechanisms of extracting energy from each. Students, independently, will be able to predict the advantages and disadvantages of each energy resource, to assess the impact of renewable energies on society and environment, and to compare its ability to replace/compete with fossil fuels.

2 – Intended learning outcomes of course (ILOs)

a Knowledge and understanding:

a1- Basics of fossil fuels

Basic knowledge of renewable energies such as:

Wind (generation, characteristics, kinds, speed measurements, turbines, turbines sitting, generators, etc)

Geothermal (phenomenon, reservoirs, exploration and drilling, turbines, power plants types, direct uses, heat pumps, etc)

Hydropower (Hydroelectric power: power calculations, micro-hydro power, water turbines and wheels. Tidal power: barrages, marine current turbines. Tidal stream power. Wave power. Water turbines, etc)

Solar (principal, direct and indirect uses of solar power, passive, active, focus and non-focus mechanisms, solar design, photovoltaic cells, Concentrated Solar Power (CSP) Plants, non-CSP plants, etc)

Biomass (definition, classes, resources, uses, adv. And disadvantages, etc)

a2- understanding of operational mechanisms of each renewable energy and how to extract energy from.

b Intellectual skills

b1- Building the student's capability to identify the points of strength and weakness in each energy resource

b2- Judging each kind of energy from an economic point of view and diagnose its degree of efficiency

b3- Deciding whether alternative renewable energy resources can replace/compete with fossil fuel or not.

c Professional and practical skills

c1- Be familiar with solar cells' operational mechanism that will be practically investigated in practical physics.

d General and transferable skills

d1- Enhancing the students' skills in using pc and Internet to search for specific topics related to the course material.

d2- Enhancing the students' writing ability of assigned reports

d3- Enhancing the students' oral communication during presenting their own written reports.

d4- Supporting the idea of teamwork through assigning a group of students for each report.

3- Contents

Topic	No. of hrs	Lecture	Tutorial / practical
Introduction: Overall discussion	2	1	0
on the course	4	2	0
contents, learning	4	2	0
objectives and policies	4	2	0
Ch. I: Fossil Fuels	4	2	0
Ch. II: Wind Energy	4	2	0
Ch. III: Hydropower Energy	4	2	0
Ch. IV: Geothermal Energy			
Ch. V: Solar Energy			
Ch. VI: Biomass Energy			

4– Teaching and learning methods

4.1- Lectures

4.2- Reports Assignment

4.3- Oral presentations

5- Student assessment methods

5.1 Reports to assess skill of collecting data & ability of team work

5.2 Oral to assess skill of discussing and analyzing the report

5.3 mid-term exam written exam to assess understanding and memorizing skills

5.4 Final term Exam written exam to assess overall performance

Assessment schedule

Assessment 1 : Reports **1report/3 weeks**

Assessment 2 : report defense **every 3 weeks**

Assessment 3 : mid-term **7th week**

Assessment 4 : Final term **14th week**

Weighting of assessments

Mid-Term Examination	**20 %**
Final-term Examination	**60 %**
Oral Examination.	**10 %**
Semester work	**10 %**
Total	**100 %**

Any formative only assessments

N/A

6- List of references

6.1- Course notes

Most of the course to be handed out to students part by part while the rest of the course is internet-based.

6.2- Essential books (text books)

There is no text book for this course. It is the students' responsibility to build up the specified course material in the same framework given by the lecturer in the 1st week.

6.3- Recommended books

6.4- Periodicals, Web sites, … etc

Web sites:

www.windpower.com,en.wikipedia.org/wiki/main_page

zebu.uoregon.edu/1998/phys162.html

7- Facilities required for teaching and learning

Dark room equipped with overhead projector and LCD projector.

Students' computer Lab. with printing and internet facilities.

Course coordinator: Dr. Mohamed H. Badr

Head of Department: Prof.Dr. Sana Maize

Date: / /