Course guides
820733 - AER - Renewable Energy Technology

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 710 - EEL - Department of Electronic Engineering.

Degree: ERASMUS MUNDUS MASTER'S DEGREE IN ENVIRONOMICAL PATHWAYS FOR SUSTAINABLE ENERGY SYSTEMS (Syllabus 2012). (Compulsory subject).
ERASMUS MUNDUS MASTER'S DEGREE IN ENVIRONOMICAL PATHWAYS FOR SUSTAINABLE ENERGY SYSTEMS (Syllabus 2013). (Compulsory subject).
MASTER'S DEGREE IN ENERGY ENGINEERING (Syllabus 2013). (Compulsory subject).

Academic year: 2020  ECTS Credits: 5.0  Languages: English

LECTURER

Coordinating lecturer: JOSE BORDONAU FARRERONS

Others:
Primer quadrimestre:
JOSE BORDONAU FARRERONS - T10, T30
EDUARDO EGUSQUIZA ESTEVEZ - T10, T30
XAVIER FLOTATS RIPOLL - T10, T30
ORIOL GOMIS BELLMUNT - T10, T30
RAFAEL MARTIN LAMAISON URIOSTE - T10, T30
JORDI LLORCA PIQUE - T10, T30
CARLOS DAVID PEREZ SEGARRA - T10, T30
ENRIQUE VELO GARCIA - T10, T30

PRIOR SKILLS
- Fundamentals of applied physics
- Fundamentals of economy
- Economic analysis of projects

REQUIREMENTS
- There are no specific requirements.
TEACHING METHODOLOGY

Teaching methodology:

The course teaching methodologies are as follows:

- Lectures and conferences: presentation of knowledge by lecturers or guest speakers.
- Participatory sessions: collective resolution of exercises, debates and group dynamics, with the lecturer and other students in the classroom; classroom presentation of an activity individually or in small groups.
- Theoretical/practical supervised work (TD): classroom activity carried out individually or in small groups, with the advice and supervision of the teacher.
- Homework assignment of reduced extension: carry out homework of reduced extension, individually or in groups.
- Homework assignment of broad extension: design, planning and implementation of a project or homework of broad extension by a group of students, and writing a report that should include the approach, results and conclusions.
- Evaluation activities (EV).

Training activities:

The course training activities are as follows:

- Face to face activities
  - Lectures and conferences: learning based on understanding and synthesizing the knowledge presented by the teacher or by invited speakers.
  - Participatory sessions: learning based on participating in the collective resolution of exercises, as well as in discussions and group dynamics, with the lecturer and other students in the classroom.
  - Presentations (PS): learning based on presenting in the classroom an activity individually or in small groups.
  - Theoretical/practical supervised work (TD): learning based on performing an activity in the classroom, or a theoretical or practical exercise, individually or in small groups, with the advice of the teacher.

- Study activities
  - Homework assignment of reduced extension (PR): learning based on applying knowledge and presenting results.
  - Homework assignment of broad extension (PA): learning based on applying and extending knowledge
  - Self-study (EA): learning based on studying or expanding the contents of the learning material, individually or in groups, understanding, assimilating, analysing and synthesizing knowledge.

LEARNING OBJECTIVES OF THE SUBJECT

Objectives

The scope of the course corresponds to technologies for harnessing renewable energy. In this area it is intended that students acquire the knowledge and skills necessary for the description, selection and sizing, as well as for calculating the performance of equipment and pre-existing installations at a basic level or pre-project. The subject aims to give an overview of the technologies and methods that allow the student to perform assessments and studies of alternatives in engineering projects. Also, the course should serve as an introduction for students who follow the specialty of renewable energy which will deepen the study of the different technologies in optional courses.

Learning outcomes

Upon completing the course, the student should:

- Understand the role of renewable energy in product and service sectors, as well as its importance in the energy chain: processing, transportation, distribution and end use; understand energy efficiency and be capable of developing valuable judgments about opportunities, threats and barriers to their use.
- Know and understand the characteristics and key players in the renewable energies sector in Spain and Europe, as well as its importance in a productive economic context.
- Know and be able to critically analyse policies to promote renewable energy.
- Have the knowledge, skills and elements of analysis and judgment necessary to select the most appropriate systems from an energetic standpoint for different types of applications (industrial or service) as well as the ability to analyse the behaviour of a system in operation and make a diagnosis on the operating system.
- Have the knowledge, skills and elements of analysis and judgment necessary to consider a pre-feasibility study, related to the use of renewable energy systems in different industrial sectors and services.
- Know the main lines of research in the field of technologies for harnessing renewable energy.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>15,0</td>
<td>12.00</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>64.00</td>
</tr>
</tbody>
</table>

Total learning time: 125 h

CONTENTS

Introduction

Description:
- Basic concepts about energy
  - Basic units.
  - Primary energy, final energy, useful energy.
  - System, sector and service.
- Key factors in the exploitation, production and use.
- Renewable energy sources; main features.

Specific objectives:
The student understands the role of renewable energy in product and service sectors, as well as its importance in the energy chain: processing, transportation, distribution and end use; understand energy efficiency and be capable of developing valuable judgments about opportunities, threats and barriers to their use.

Related activities:
1. Exercise on introduction

Full-or-part-time: 8h 20m
Theory classes: 2h
Practical classes: 1h
Guided activities: 1h
Self study: 4h 20m

ACTIVITIES

1. Exercise on introduction

Description:
Individually carry out an exercise on units, energy (primary, final and useful) and renewable resources.

Specific objectives:
Deepen knowledge and its application in solving basic exercises of calculations of quantities of energy.

Material:
- Description of the exercise.
- References and data sources.

Delivery:
Report of the results.

Full-or-part-time: 6h 20m
Practical classes: 1h
Guided activities: 1h
Self study: 4h 20m
GRADING SYSTEM

Written test (PE). 60%
Work performed individually or in groups (TR). 40%

RESOURCES

Other resources:
Documentation is prepared by the teachers of the course and available in Atenea.
The documentation is updated every year.