

## 66333 - Hydraulic and wind energy

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	535 - Master's in Renewable Energies and Energy Efficiency 330 - Complementos de formación Máster/Doctorado
<b>ECTS</b>	6.0
<b>Course</b>	XX
<b>Period</b>	Half-yearly
<b>Subject Type</b>	ENG/Complementos de Formación, Compulsory
<b>Module</b>	---

### **1.Basic info**

#### **1.1.Recommendations to take this course**

#### **1.2.Activities and key dates for the course**

### **2.Initiation**

#### **2.1.Learning outcomes that define the subject**

#### **2.2.Introduction**

### **3.Context and competences**

#### **3.1.Goals**

#### **3.2.Context and meaning of the subject in the degree**

#### **3.3.Competences**

#### **3.4.Importance of learning outcomes**

### **4.Evaluation**

### **5.Activities and resources**

#### **5.1.General methodological presentation**

#### **Hydraulic and wind energy**

The learning process which has been designed for this subject is based in the following:

The development of this subject is structured in three activities: theory, practical lessons and to write an essay.

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In the theoretical sessions are explained the basic concepts and are related with the technical characteristics of the process using short exercises which have solved in the blackboard as a support to fix the compression of the concepts.

In the practical lessons are combines the laboratory experiments with computing exercises to study practical examples more complex than the exercises explained in the blackboard, where it is necessary for its solution some significant calculations. Also, we will visit some installations where we will see the application of the learning concepts and the simulation exercises in our computing lessons.

The essay of this subject will have a focus on the introduction to research. In this work, the student will have to study and analyze a new topic assigned by the teacher to get and present his/her own conclusions in a concrete aspect and with higher depth of this subject.

### 5.2.Learning activities

The subject syllabus has the following activities to goal the forecast results:

The theoretical lessons: The technical concepts are explained with master lectures. Technology papers are analyzed and discussed as a self-learning.

The practical lessons: The exercises are solved by the students (small groups), then the groups discuss about it and they fix the understanding of the theoretical concepts.

The learned theoretical concepts will be researched in the laboratory.

The student will carry out an essay with a focus on engineering and technological development. In this work, the student will have to study and analyze a new topic assigned by the teacher.

### 5.3.Program

1. Basic aspects and wind resources analysis
2. Wind Turbine technology
3. Construction of wind farms
4. Operation and maintenance of wind farms: production control
5. Basic aspects of the hydropower production
6. Hydraulic concepts and civil engineering
7. Electromechanical equipment
8. Design, installation, operation and maintenance

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9. Financial viability analysis of the wind and hydropower installations: fundamental aspects

10. Optical dimensioning of embedded systems

### 5.4.Planning and scheduling

Timetable - the information is in the following link:

[https://eina.unizar.es/estudios/index.php?option=com\\_content&view=article&id=85&catid=79](https://eina.unizar.es/estudios/index.php?option=com_content&view=article&id=85&catid=79)

### 5.5.Bibliography and recommended resources

Energía eólica, Autores: Ana Talayero y Enrique Telmo, Edit. Universidad de Zaragoza

Sistemas Eolicos De Produccion De Energia Electrica Autor : Rodriguez Amenedo, J.L., Editor : Rueda