Course guides
250461 - MODAMB - Environmental Modelling

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Optional subject).
Academic year: 2020 ECTS Credits: 5.0 Languages: Catalan, Spanish, English

LECTURER
Coordinating lecturer: AGUSTÍ PÉREZ FOGUET
Others: MARC BERENGUER FERRER, AGUSTÍ PÉREZ FOGUET

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
8231. The ability to plan, evaluate and regulate the use of surface water and groundwater resources.
8233. Knowledge of and the ability to understand dynamic phenomena of the coastal ocean and atmosphere and respond to problems encountered in port and coastal areas, including the environmental impact of coastal interventions. The ability to analyse and plan maritime works.

Transversal:
8559. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding the mechanisms on which scientific research is based, as well as the mechanisms and instruments for transferring results among socio-economic agents involved in research, development and innovation processes.
8560. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.
8561. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY
The subject is carried out in sessions of 3h, usually divided into 2 parts: One of theory and one of practice.
LEARNING OBJECTIVES OF THE SUBJECT

Specialization subject in which knowledge on specific competences is intensified.

Knowledge and skills at specialization level that permit the development and application of techniques and methodologies at advanced level.

Contents of specialization at master level related to research or innovation in the field of engineering.

Specialization course in Environmental Engineering and Sustainability in which knowledge in specific competences of the Master in Road, Channel and Port Engineering is intensified. It has knowledge at the level of specialization in environmental modeling that should allow developing and applying advanced level techniques and methodologies. Knows contents of specialization at master level in the area of environmental modeling and relates them to innovation in the field of engineering. Acquires capabilities to integrate environmental requirements in the practice of engineering and in the process of technological and social innovation. It models complex environmental processes in which infrastructures or services intervene from the analysis of observed data of environmental variables.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>19.5</td>
<td>27.12</td>
</tr>
<tr>
<td>Hours small group</td>
<td>9.8</td>
<td>13.63</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6.0</td>
<td>8.34</td>
</tr>
<tr>
<td>Self study</td>
<td>26.8</td>
<td>37.27</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>9.8</td>
<td>13.63</td>
</tr>
</tbody>
</table>

Total learning time: 71.9 h

CONTENTS

Environmental engineering

Description:

Full-or-part-time: 7h 11m
Theory classes: 3h
Self study : 4h 11m

Environmental models

Description:
Typologies, structure and formulations. Phases of modeling and model development
A1
Modeling of environmental complexity.
A2

Full-or-part-time: 21h 36m
Theory classes: 6h
Practical classes: 2h
Laboratory classes: 1h
Self study : 12h 36m
## Data analysis and statistics

**Description:**

**Full-or-part-time:** 14h 23m
Practical classes: 4h
Laboratory classes: 2h
Self study: 8h 23m

## Calibration and parameter estimation

**Description:**
Regression models. Analysis of variance.
Practical application

**Full-or-part-time:** 7h 11m
Theory classes: 1h 30m
Laboratory classes: 1h 30m
Self study: 4h 11m

## Model evaluation

**Description:**
Match and association analysis. Quality measures
Verification and validation.
Simulation. Sensibility and uncertainty

**Full-or-part-time:** 21h 36m
Theory classes: 6h
Practical classes: 3h
Self study: 12h 36m

## Decision making. Environmental impact.

**Description:**
Introduction to decision making
Environmental impact studies.
Environmental planning

**Full-or-part-time:** 7h 11m
Theory classes: 3h
Self study: 4h 11m
Risk and emergency

Description:
Risk analysis
Ecotoxicity models
Environmental emergencies

Full-or-part-time: 7h 11m
Theory classes: 3h
Self study: 4h 11m

Overview

Full-or-part-time: 7h 11m
Laboratory classes: 3h
Self study: 4h 11m

GRADING SYSTEM

The grade of the subject is divided into 30% of the A1 activity carried out throughout the course, 30% of oral group work A2, 30% of the final control of exploitation and 10% follow-up of the course.

EXAMINATION RULES.

If an activity is not carried out according to the guidelines of the statement, it will be marked as zero.

BIBLIOGRAPHY

Basic:
Complementary: