Course guides
250431 - DINFLUV - River Dynamics

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

LECTURER

Coordinating lecturer: ERNEST BLADE CASTELLET
Others: ERNEST BLADE CASTELLET, JUAN PEDRO MARTÍN VIDE, GONZALO JAVIER OLIVARES CERPA, BENIAMINO RUSSO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONtributes

Specific:
8230. The ability to plan, dimension, construct and maintain hydraulic works.
8231. The ability to plan, evaluate and regulate the use of surface water and groundwater resources.

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 course consists of 3 hours a week of classes in the regular classroom and the classroom informàtica. S uses material support through the virtual campus ATENEA: content, programming and evaluation activities of learning and bibliography.

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.

The subject gives an overview of various aspects of River Dynamics and complements the knowledge previously acquired river engineering. We see a vision that encompasses ecological, numerical methods, descriptive and theoretical aspects. The course is taught by several professors that provide an overview of the current state of the art, tools and latest trends.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.80</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Hours large group</td>
<td>19,5</td>
<td>15.59</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>63.95</td>
</tr>
</tbody>
</table>

Total learning time: 125.1 h

CONTENTS

Introduction
Description:
Description of the current state of rivers in developed countries and the problems that arise

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

Hydraulic Ecology
Description:
Approach to the ecological functioning of river
Seasonal patterns and evolution of the composition of the water

Full-or-part-time: 14h 23m
Theory classes: 3h
Practical classes: 3h
Self study : 8h 23m

Modelling fluvial processes
Description:
Description of numerical methods if equations that describe fluvial processes beyond hydrodynamics: transport of sediments, pollutants, turbulence, wind, etc..
Using numerical simulation tools for the analysis of pollutants and sediment transport.
Use of hydoinformatics for simulation of fluvial processes. Advanced hydrodynamic aspects: bridges, gates, culverts, wind, dam break, etc..
Models and theory sembliança reduced by fluvial dynamics studies. Case Studies

Full-or-part-time: 28h 47m
Theory classes: 3h
Laboratory classes: 9h
Self study : 16h 47m
Reservoirs

Description:
Analysis of the hydrodynamics of a Mediterranean reservoir along a year. Modeling tools

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

Impacts on rivers

Description:
Effects of infrastructures, mainly dams, in the dynamics of rivers. Alterations due to dams, cooling facilities, etc.

Full-or-part-time: 14h 23m
Theory classes: 3h
Practical classes: 3h
Self study: 8h 23m

Equilibrium and sediment transport

Description:
Aspects that influence the transversal and longitudinal equilibrium of a river. Expected evolution. Effects of nonuniform distribution of grain size on the sedimentary dynamics of a river

Full-or-part-time: 14h 23m
Theory classes: 3h
Laboratory classes: 3h
Self study: 8h 23m

Other

Description:
A speaker on a topic of current interest on fluvial dynamics will be invited

Full-or-part-time: 3h 35m
Theory classes: 1h 30m
Self study: 2h 05m

Evaluation

Full-or-part-time: 3h 35m
Laboratory classes: 1h 30m
Self study: 2h 05m

GRADING SYSTEM

The rating of the course is obtained from the continuous assessment marks which consist of courseworks and exams.

Courseworks are volunteer. Each coursework will be considered as one or two additional questions of the final exam. If all the courseworks are done, they will represent 50% of the final grade.
EXAMINATION RULES.

The courseworks are done in groups of two students.

BIBLIOGRAPHY

Basic:

Complementary: