250431 - DINFLUV - River Dynamics

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2015
Degree: MASTER’S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Optional)
MASTER’S DEGREE IN CIVIL ENGINEERING (RESEARCH TRACK) (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: ERNEST BLADE CASTELLET
Others: ERNEST BLADE CASTELLET, JOSE DOLZ RIPOLLES, JUAN PEDRO MARTÍN VIDE

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.

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 in 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></th>
<th>Total learning time: 125h</th>
<th>Theory classes:</th>
<th>19h 30m</th>
<th>15.60%</th>
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<tbody>
<tr>
<td></td>
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<td>Practical classes:</td>
<td>9h 45m</td>
<td>7.80%</td>
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<td></td>
<td></td>
<td>Laboratory classes:</td>
<td>9h 45m</td>
<td>7.80%</td>
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<td>Guided activities:</td>
<td>6h</td>
<td>4.80%</td>
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<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
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# Content

## Introduction

<table>
<thead>
<tr>
<th>Learning time: 7h 11m</th>
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<tbody>
<tr>
<td>Theory classes: 3h</td>
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<tr>
<td>Self study : 4h 11m</td>
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**Description:**
Description of the current state of rivers in developed countries and the problems that arise

## Hydraulic Ecology

<table>
<thead>
<tr>
<th>Learning time: 14h 23m</th>
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<tbody>
<tr>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td>Practical classes: 3h</td>
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<tr>
<td>Self study : 8h 23m</td>
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**Description:**
Approach to the ecological functioning of river
Seasonal patterns and evolution of the composition of the water

## Modelling fluvial processes

<table>
<thead>
<tr>
<th>Learning time: 28h 47m</th>
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<tr>
<td>Theory classes: 3h</td>
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<tr>
<td>Laboratory classes: 9h</td>
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<tr>
<td>Self study : 16h 47m</td>
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**Description:**
Description of numerical methods if equations that describe fluvial processes beyond hydrodynamics: transport of sediments, pollutants, turbulence, wind, etc..<br>Using numerical simulation tools for the analysis of pollutants and sediment transport.<br>Use of hydoinformatics for simulation of fluvial processes. Advanced hydrodynamic aspects: bridges, gates, culverts, wind, dam break, etc..<br>Models and theory sembřilanca reduced by fluvial dynamics studies. Case Studies

## Reservoirs

<table>
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<th>Learning time: 7h 11m</th>
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<tr>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td>Self study : 4h 11m</td>
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**Description:**
Analysis of the hydrodynamics of a Mediterranean reservoir along a year. Modeling tools
### Impacts on rivers

**Learning time:** 14h 23m
- Theory classes: 3h
- Practical classes: 3h
- Self study: 8h 23m

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

### Equilibrium and sediment transport

**Learning time:** 14h 23m
- Theory classes: 3h
- Laboratory classes: 3h
- Self study: 8h 23m

**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

### Other

**Learning time:** 3h 35m
- Theory classes: 1h 30m
- Self study: 2h 05m

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

### Evaluation

**Learning time:** 3h 35m
- Laboratory classes: 1h 30m
- Self study: 2h 05m

### Qualification 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.

### Regulations for carrying out activities

The courseworks are done in groups of two students.
Bibliography

Basic:


Complementary: