Last update: 04-11-2015

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 3hores 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 aspectsof 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.

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Study load

Total learning time: 125h	Theory classes:	19h 30m	15.60%
	Practical classes:	9h 45m	7.80%
	Laboratory classes:	9h 45m	7.80%
	Guided activities:	6h	4.80%
	Self study:	80h	64.00%

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Content

Introduction

Learning time: 7h 11m

Theory classes: 3h
Self study : 4h 11m

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

Hydraulic Ecology

Learning time: 14h 23m

Theory classes: 3h
Practical classes: 3h
Self study : 8h 23m

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

Modelling fluvial processes

Learning time: 28h 47m

Theory classes: 3h
Laboratory classes: 9h
Self study : 16h 47m

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 sembñlança reduced by fluvial dynamics studies. Case Studies

Reservoirs

Learning time: 7h 11m

Theory classes: 3h
Self study : 4h 11m

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

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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 intereston 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 vounteer. Each coursework will be considered as one or two additional questions of the final exam. If all the courseworks sre ddone, they will represent 50% of the final grade.

Regulations for carrying out activities

The courseworks are done in groups of two students

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Bibliography

Basic:

G.E. Petts, C. Amoros. Fluvial Hydrosystems. Chapman Hall, 1996.

Chaudhry, M.H. Open Channel Flow. Prentice Hall, 1993.

Martín Vide, J.P. Ingeniería de ríos. 2a ed. Barcelona: Edicions UPC, 2006. ISBN 9788483019009.

Complementary:

Varis. Sedimentation Engineering. Processes, Measurements, Modeling and Practice. Marcelo H. García. ASCE, 2007.

E. Toro. Shock-Capturing Methods for Free-Surface Shallow Flows.. Wiley and Sons Limited, 2001.