



Course guide

250431 - DINFLUV - River Dynamics

Last modified: 28/03/2024

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: 2023 **ECTS Credits:** 5.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: ERNEST BLADE CASTELLET

Others: ERNEST BLADE CASTELLET, CARLES FERRER BOIX, 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.

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 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.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

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.



STUDY LOAD

Type	Hours	Percentage
Self study	80,0	63.95
Hours small group	9,8	7.83
Hours large group	25,5	20.38
Hours medium group	9,8	7.83

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 sembïlança 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
The temperature in 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:

- Petts, G.E.; Amoros, C. Fluvial hydrosystems. London: Chapman & Hall, 1996. ISBN 0412371006.
- Chaudhry, M.H. Open-channel flow [on line]. 2nd ed. New York: Prentice Hall, 2007 [Consultation: 13/05/2020]. Available on: <http://dx.doi.org/10.1007/978-0-387-68648-6>. ISBN 9780387301747.
- Martín Vide, J.P. Ingeniería de ríos. 2a ed. Barcelona: Edicions UPC, 2006. ISBN 9788483019009.

Complementary:

- Sedimentation engineering: processes, measurements, modeling and practice [on line]. New York: ASCE, 2007 [Consultation: 08/01/2020]. Available on: <https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=3115359>. ISBN 9780784471289.
- Toro, E.F. Shock-capturing methods for free-surface shallow flows. Chichester: John Wiley & Sons, 2001. ISBN 0471987662.