

28753 - Hydraulic Works and Hydroelectric Exploitation

Syllabus Information

Academic Year: 2019/20

Subject: 28753 - Hydraulic Works and Hydroelectric Exploitation

Faculty / School: 175 -

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year: 4

Semester: Second semester

Subject Type: Optional

Module: ---

1.General information

1.1.Aims of the course

The main objective of the subject "Hydraulic Works and Hydroelectric Exploitation" is to provide the criteria of design and calculation of the most common hydraulic works, as well as the technological know-how of their operation.

1.2.Context and importance of this course in the degree

The subject of "Hydraulic Works and Hydroelectric Exploitation" is framed in the Civil Engineering Degree of the EUPLA. This is a six-month, optional, fourth-year subject and has 6 ECTS credits.

1.3.Recommendations to take this course

The subject of "Hydraulic Works and Hydroelectric Exploitation" has no mandatory prerequisites, although students are advised to have taken and passed the subjects of "Hydraulic Engineering: Basics", "Extension of Hydraulic Engineering and Hydrology" and "Extension of Surface Hydrology".

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process designed for this subject is based on a strong interaction between the professor and the student. This interaction is brought into being through a division of work and responsibilities between the students and the professor. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the professor of the subject.

The current subject is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, at the same time supported by other activities. The current subject is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, at the same time supported by other activities

The organization of teaching will be carried out using the following steps:

- **Theory sessions:** Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.
- **Practical sessions:** The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Laboratory Workshop:** The lecture group is divided up into various groups, according to the number of registered students, but never with more than 5 students, in order to make up smaller sized groups.
- **Individual Tutorials:** Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

4.2.Learning tasks

The programme offered to the student to help them achieve their target involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out. The activities are differentiated as following:

Face-to-face generic activities:

- **Theory sessions:** The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.
- **Practical sessions:** Problems and practical cases are carried out, complementary to the theoretical concepts studied.
- **Laboratory Workshop:** This work is tutored by a teacher, in groups of no more than 5 students.

Generic non-class activities:

- Study and understanding of the theory taught in the lectures.
- Understanding and assimilation of the problems and practical cases solved in the practical classes.
- Preparation of seminars, solutions to proposed problems, etc.
- Preparation of laboratory workshops, preparation of summaries and reports.
- Preparation of the written tests for continuous assessment and final exams.

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class. A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is moderate.

Activity	Weekly school hours
Lectures	3
Laboratory Workshop	1
Other Activities	6

Nevertheless the previous table can be shown into greater detail, taking into account the following overall distribution:

- 40 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.
- 4 hours of laboratory workshop, in 2 hour sessions.
- 6 hours of written assessment tests, one hour per test.
- 10 hours of PPT presentations.
- 90 hours of personal study, divided up over the 15 weeks of the 2nd semester.

There is a tutorial calendar timetable set by the teacher that can be requested by the students who want a tutorial.

4.3.Syllabus

Theory

- Topic 1: Introduction about dams
- Topic 2: Basic principles of soil mechanics applied to fill dams
- Topic 3: Gravity Dams
- Topic 4: Further concepts about dam engineering
- Topic 5: Dams and hydropower engineering
- Topic 6: River engineering
- Topic 7: Water Supply and distribution networks
- Topic 8: Valves
- Topic 9: Urban drainage and sewer system
- Topic 10: Hydraulic jumps

Practical contents

Most of the issues mentioned in the previous section are related to exercises to be done during the face-to-face sessions. During the course a specific laboratory activity about dam engineering will be performed.

4.4.Course planning and calendar

Schedule sessions and presentation of works

The dates of the two final exams will be published on the official EUPLA web page.

Other relevant dates about intermediate examinations and presentation of autonomous works will be communicated by the professor during the first session of the course and published on Moodle platform.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28753&year=2019