

28731 - Hydraulic Infrastructures in the Urban Environment

Syllabus Information

Academic Year: 2019/20

Subject: 28731 - Hydraulic Infrastructures in the Urban Environment

Faculty / School: 175 -

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year: 4

Semester: Second semester

Subject Type: Compulsory

Module: ---

1.General information

1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

The water supply and sanitation networks are fundamental for the performance of cities and new urban developments.

Investments in these areas in developing countries provide maximum returns on concepts such as improved living standards and increased gross domestic product.

The networks not only consist of a series of pipes, but also require a series of complex installations to work properly: pumps, spillways, storm tanks, etc.

This course provides the necessary knowledge for the design and operation of these networks.

1.2.Context and importance of this course in the degree

The subject Hydraulic Infrastructures in an urban environment, is part of the Degree in Civil Engineering taught by EUPLA, is framed within the group of subjects that make up the module called Specific Training relating to the training itinerary of Hydrology. This is a third year course located in the first semester and compulsory (OB), with a teaching load of 6 ECTS credits. In addition, this subject can be taken with optional character in the formative itinerary of Civil Constructions.

This course corresponds to a specific speciality of the profession of Civil Engineer suitable for the professional development of the graduate.

1.3.Recommendations to take this course

There are no prerequisites to take this course. However, the contents to be studied will require the skills and abilities acquired in the following subjects, mainly.

- Graphic Expression: The graphic resources are necessary to represent the technical solutions associated with the subject. CAD programs will be used.

- Geology: The definition of sanitation and water supply works requires a basic knowledge of geology.

- Geotechnics: The definition of the sanitation and water supply works requires to know the basic concepts of geotechnics.

- Fundamentals of Hydraulic Engineering and Extension of Hydraulic and Hydrological Engineering: The concepts of these subjects are fundamental for developing the designs to be carried out during the course of the subject.

- Topography: Sanitation and water supply must be reflected in the real terrain, for this, the student should manage the topographic tools.

- Mathematics: Problem solving requires the application of equations, hypotheses and calculation strategies acquired in these subjects.

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 the following:

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. 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 teacher.

The current subject Infraestructuras hidráulicas en medio urbano (Urban hydraulic infrastructures) 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 real-world projects, at the same time supported by other activities

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

? **Theory Classes:** 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 Classes:** The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.

? **Project Development Support Classes:** The lecture group is divided up into various groups, according to the number of registered students, but never with more than 20 students, in order to make up smaller sized groups. The students will develop real-world projects using the concepts learned in the theory and practical classes

? **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

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 the following:

? **Face-to-face generic activities:**

? **Theory Classes:** The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.

? **Practical Classes:** Problems and practical cases are carried out, complementary to the theoretical concepts studied.

? **Project Development Support Classes:** This work is tutored by a teacher, in groups of no more than 20 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 real-world projects.

? 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
supervised practice sessions	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.
- ? 10 hours of Project Development Support Classes (supervised practice sessions), in 1 or 2 hour sessions.
- ? 6 hours of written assessment tests, one hour per test.
- ? 4 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

Lesson 1. Water supply. General concepts.
Lesson 2. Urban water consumption.
Lesson 3. Water inlets
Lesson 4. Calculate water supply networks.
Lesson 5. Materials and equipment in water supply networks.
Lesson 6. Design & Construction of water supply projects.
Lesson 7. Operation & Maintenance of water supply systems.
Lesson 8. Sanitary. General concepts.
Lesson 9. Urban hydrology.
Lesson 10. Hydraulics of drainage networks.
Lesson 11. Calculate drainage networks
Lesson 12: Materials and equipment in drainage/sanitary networks.
Lesson 13. Facilities of drainage/sanitary networks.
Lesson 14. Design & Construction of drainage/sanitary projects.
Lesson 15. Operation & Maintenance of drainage systems.

4.4.Course planning and calendar

The list below shows the contents of each week. They are consistent with the lessons of the subject (The order could be modified in case of changes in the university calendar)

Week 1: Lesson 1. Water supply. General concepts.
Week 2: Lesson 2. Urban water consumption.
Week 3: Lesson 3. Water inlets
Week 4: Lesson 4. Calculate water supply networks.
Week 5: Lesson 5. Materials and equipment in water supply networks.
Week 6: Lesson 6. Design & Construction of water supply projects.
Week 7: Lesson 7. Operation & Maintenance of water supply systems.
Week 8: Lesson 8. Sanitary. General concepts.
Week 9: Lesson 9. Urban hydrology.
Week 10: Lesson 10. Hydraulics of drainage networks.
Week 11: Lesson 11. Calculate drainage networks
Week 12: Lesson 12: Materials and equipment in drainage/sanitary networks.
Week 13: Lesson 13. Facilities of drainage/sanitary networks.
Week 14: Lesson 14. Design & Construction of drainage/sanitary projects.
Week 15: Lesson 15. Operation & Maintenance of drainage systems.

The dates of the final exams will be those that are officially published at

<http://eupla.unizar.es/asuntos-academicos/examenes>

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28731&year=2019