

## 28729 - Supply and Sanitation Systems for Construction Engineering

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	175 - Escuela Universitaria Politécnica de La Almunia
<b>Degree</b>	423 - Bachelor's Degree in Civil Engineering
<b>ECTS</b>	6.0
<b>Course</b>	
<b>Period</b>	Second semester
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

### **1.Basic info**

#### **1.1.Recommendations to take this course**

#### **1.2.Activities and key dates for the course**

### **2.Initiation**

#### **2.1.Learning outcomes that define the subject**

#### **2.2.Introduction**

### **3.Context and competences**

#### **3.1.Goals**

#### **3.2.Context and meaning of the subject in the degree**

#### **3.3.Competences**

#### **3.4.Importance of learning outcomes**

### **4.Evaluation**

### **5.Activities and resources**

#### **5.1.General methodological presentation**

**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.

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The current subject Sistemas de Abastecimiento y Saneamiento en la Ingeniería de la Construcción (Water supply and Sanitary systems in Civil Engineering) 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.

### 5.2.Learning activities

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.

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• 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 2<sup>nd</sup> semester.

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

### 5.3.Program

Lesson 1. Water supply. General concepts.

Lesson 2. Urban water consumption.

Lesson 3. Calculate water supply networks.

Lesson 4. Materials and equipment in water supply networks.

Lesson 5. Water supply projects.

Lesson 6. 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. Materials and equipment in drainage/sanitary networks.

Lesson 12: Facilities of drainage/sanitary networks.

Lesson 13. Drainage/sanitary projects.

Lesson 14. Construction of drainage/sanitary projects.

Lesson 15. Operation & Maintenance of drainage systems.

### 5.4.Planning and scheduling

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.

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Week 3: Lesson 3. Calculate water supply networks.

Week 4: Lesson 4. Materials and equipment in water supply networks.

Week 5: Lesson 5. Water supply projects.

Week 6: Lesson 6. 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. Materials and equipment in drainage/sanitary networks.

Week 12: Lesson 12: Facilities of drainage/sanitary networks.

Week 13: Lesson 13. Drainage/sanitary projects.

Week 14: Lesson 14. Construction of drainage/sanitary projects.

Week 15: Lesson 15. Operation & Maintenance of drainage systems.

### 5.5. Bibliography and recommended resources

- Hernández Muñoz, Aurelio. Saneamiento y alcantarillado : vertidos de aguas residuales / Aurelio Hernández Muñoz . - 7ª ed. rev. y amp. Madrid : Colegio de Ingenieros de Caminos, Canales y Puertos, 2007
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- Mateos de Vicente, Manuel. Conducciones : elementos de hidráulica práctica, básica, sucinta (presentados de forma sencilla) / Manuel Mateos de Vicente . - 1ª ed. Madrid : Bellisco, 1997
- CEDEX. Guía técnica sobre tuberías para el transporte de agua a presión / [Centro de Estudios y Experimentación de Obras Públicas y Dirección General de Obras Hidráulicas y Calidad de las Aguas. - 5a ed Madrid : CEDEX, D.L. 2007
- Centro de Estudios Hidrográficos (España). Guía técnica sobre redes de saneamiento y drenaje urbano / Centro de Estudios Hidrográficos. - 2 ed Madrid : Centro de Publicaciones, Ministerio de Fomento, D.L. 2008