

## 28759 - Sanitary Engineering

### Información del Plan Docente

<b>Academic Year</b>	2018/19
<b>Subject</b>	28759 - Sanitary Engineering
<b>Faculty / School</b>	175 - Escuela Universitaria Politécnica de La Almunia
<b>Degree</b>	423 - Bachelor's Degree in Civil Engineering
<b>ECTS</b>	6.0
<b>Year</b>	4
<b>Semester</b>	Second semester
<b>Subject Type</b>	Optional
<b>Module</b>	---

### **1.General information**

#### **1.1.Aims of the course**

#### **1.2.Context and importance of this course in the degree**

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

### **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**

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 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.

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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.

**Laboratory Workshop:** 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.

**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.

• **Laboratory Workshop:** 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 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

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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.

### 4.3.Syllabus

- Topic 1. Water. Properties, physico-chemical characteristics
- Topic 2. The water cycle and its interaction with the environment
- Topic 3. Regulations
- Topic 4. Water Microbiology
- Topic 5. Introduction to debug systems
- Topic 6. Activated sludge. Water line. pretreatment
- Topic 7. Activated sludge. Water line. Primary treatment
- Topic 8. Activated sludge. Water line. Secondary treatment
- Topic 9. Activated sludge. Water line. tertiary treatment
- Topic 10. Activated sludge.
- Topic 11. biological filters, trickling filters, biodiscs
- Topic 12. Green Filters
- Topic 13. Water Purification
- Topic 14. Reuse treated water

Each topic discussed in the previous section, carries associated practical exercises on real cases of application in several companies: engineering, industry and the free exercise of the profession. During this course practical activities consist of the following will take place:

1. Determination of various physico-chemical parameters of water.
2. Determination of BOD
3. Technical visits to EDAR and ETAP

### 4.4.Course planning and calendar

The planning orientation shown below

&mdash; **Week 1, 2 and 3:** Topic 1.

&mdash; **Week 4:** Topic 2.

&mdash; **Week 5:** Topic 3.

&mdash; **Week 6:** Topic 4.

&mdash; **Week 7:** Topic 5.

&mdash; **Week 8:** Topic 6.

&mdash; **Week 9:** Topic 7.

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&mdash; **Week 10:** Topic 8.

&mdash; **Week 11:** Topic 9.

&mdash; **Week 12:** Topic 10.

&mdash; **Week 13:** Topic 11.

&mdash; **Week 14 and 15:** Topic 12.

### MATERIAL RESOURCES

Material	Format
Topic theory notes Topic problems	Paper/repository
Topic theory notes Topic presentations Topic problems Related links	Digital/Moodle  E-Mail
Educational software	Web page

The timetables and dates of the final exams will be those published officially at:

<https://eupla.unizar.es/asuntos-academicos/calendario-y-horarios>

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

### 4.5. Bibliography and recommended resources