



Year : 2018/19

## **28918 - Strength of materials and structural analysis**

### **Syllabus Information**

<b>Academic Year:</b>	2018/19
<b>Subject:</b>	28918 - Strength of materials and structural analysis
<b>Faculty / School:</b>	201 -
<b>Degree:</b>	437 - Degree in Rural and Agri-Food Engineering
<b>ECTS:</b>	6.0
<b>Year:</b>	2
<b>Semester:</b>	Second semester
<b>Subject Type:</b>	Compulsory
<b>Module:</b>	---

### **General information**

#### **Aims of the course**

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

#### **Recommendations to take this course**

#### **Learning goals**

#### **Competences**

#### **Learning goals**

#### **Importance of learning goals**

#### **Assessment (1st and 2nd call)**

#### **Assessment tasks (description of tasks, marking system and assessment criteria)**

#### **Methodology, learning tasks, syllabus and resources**

#### **Methodological overview**

The learning process designed for this course is based on the following methodologies: Theoretical sessions, Problem-solving Sessions, Computer lab sessions and Practical sessions.

#### **Learning tasks**

The program that the student is offered to achieve the expected results includes the following activities:

- Theoretical sessions. The teacher explains the theoretical content of each session. One of the objectives of this activity will be the promoting of the participation of the students and the cooperative learning.
- Problem-solving sessions. Students, working individually or in groups, gain knowledge and skills by working to respond problems and questions. A report of the problems resolved by students will be required.
- Computer lab sessions. Students use specific structural calculation software.
- Practical sessions. Students, working in groups, gain knowledge about the testing of materials and the analysis of deformations of structural elements under different load cases.

## **Syllabus**

### **Theory**

#### MODULE 0. PRESENTATION OF THE SUBJECT

0. Presentation, methodology and system of evaluation.

#### MODULE 1. INTRODUCTION TO MATERIAL STRENGTHS AND CALCULATION OF STRUCTURES

1. Basic concepts of statics

#### MODULE 2. MATERIAL STRENGTHS

2. Simple traction and compression below the elastic limit.

3. Coplanar tensions. Principal tensions.

4. Bending: cutting forces (V) and bending moments (M)

5. Bending: normal tensions due to bending moment

6. Bending: cutting tensions due to the cutting force V

7. Bending: deformations caused by the bending moment

8. Bending: static indetermination in bending. Continuous beams

9. Diverted bending and compound bending

10. Flexo-compression or bulging

11. Torsion and combined forces.

#### MODULE 3. CALCULATION OF STRUCTURES OF BARS

12. Methods of calculation for articulated plane systems. Trusses.

13. Methods of calculating statically indeterminate bar structures

**Practicals**

PRACTICAL 1. DEFORMATION IN BEAMS BY SIMPLE BENDING

- a) Deformation in bi-supported beams, beams of two materials.
- b) Deformation in supported/ built-in beams, beams of two materials.
- c) Deformation in built-in beams, beams of two materials.

PRACTICAL 2. DEFORMATION IN DEMAND BEAMS BY DIVERTED BENDING

- a) Deformation in a beam built into a ledge

PRACTICAL 3. DEFORMATION IN PLANE PORTICOS

Arrow in the middle of a girder and rotation on the head of a bi-supported portico, situations of point load in the middle of a girder and horizontal point load on the head of the pillar.

Arrow in the middle of a girder and rotation on the head of a built-in portico, situations of point load in the middle of a girder and horizontal point load on the head of the pillar.

**Course planning and calendar**

Tipo1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Actividad	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	20
/ Semana	feb	feb	feb	mar	mar	mar	abr	abr	abr	abr	may	may	may	may	may	jun	jun	jun	jun	30
Actividad																				
Presencial																				
Teoría	2	2	2	2	2	2	1	2		1	2	2	2	2	1					27
Problemas	2	2	2	2	2	2														14
Prácticas laboratorio							2		2	2	2	2	2	2						12
Trabajos en grupo																				0
Salidas de prácticas																				0
Tutorías ECTS																				0
Evaluación Actividad No presencial																	4			4
Trabajo individual:	4	4	4	3	4	5	3	6	6	4	4	3	4	6	8	8	4			88

