

## 28606 - Physics II: static structure

### Información del Plan Docente

Academic Year	2016/17
Academic center	175 - Escuela Universitaria Politécnica de La Almunia
Degree	422 - Bachelor's Degree in Building Engineering
ECTS	6.0
Course	1
Period	Second semester
Subject Type	Basic Education
Module	---

### 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 "Física II: estática estructural" 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 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.

### 5.2.Learning activities

**The programme offered to the student to help them achieve their target results is made up of the following 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.
- **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 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	4
Laboratory workshop	2
Other activities	4

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

- 54 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.
- 6 hours of written assessment tests, one hour per test.
- 90 hours of personal study, divided up over the 15 weeks of the 2<sup>nd</sup> semester.

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

### 5.3.Program

This course is required for all students in engineering and architecture. It will introduce the concepts and practice of Physics. The topics and tools presented here provide the foundation needed in any engineering course.

The main topics developed here are:

- Statics of particles
- System of forces and moment
- Equilibrium and reactions at supports and connections
- Friction
- Centroids and centres of gravity
- Distributed forces
- Fluid statics
- Analysis of structures
- Forces in beams and cables
- Moments of inertia of area
- Elasticity

### 5.4.Planning and scheduling

**Class hall sessions & work presentations timetable :**

Class room and timetables are officially published at [Horario de clases](#) .

The dates of the final exams will be those that are officially published at [Distribución de exámenes](#) .

The written assessment tests will be related to the following topics:

- **Test 1** : Statics of particles, System of forces and moment, Equilibrium and reactions at supports and connections, Friction.
- **Test 2** : Centroids and centres of gravity, Distributed forces, Fluid statics, Analysis of structures.
- **Test 3** : Forces in beams and cables, Moments of inertia of area, Elasticity.

**Estimated timetable of lectures**

Week	Topic	Theme
1	I	Statics of particles
2		

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3	II	System of forces and moment
4		
5	III	Equilibrium and reactions at supports and connections, friction
6		
7	IV	Centroids and centres of gravity, distributed forces and fluid statics
8		
9	V	Analysis of structures
10		
11	VI	Forces in beams and cables
12		
13	VII	Moment of inertia of area and elasticity
14		
15		

Important dates, such as work presentations, laboratory practices, written exams, among other foreseen activities will be communicate to the students in the class room or through the Moodle platform a long time in advance.

### 5.5. Bibliography and recommended resources

#### Materials

Material	Format
Topic theory notes	Paper/repository
Topic problems	
Topic theory notes	
Topic presentations	Digital/Moodle
Topic problems	
Related links	E-mail
Educational software	Open source Maxima and Octave

#### Recommended resources

- Beer, Ferdinand P. Vector mechanics for engineers: Statics / Ferdinand Beer, E. Russell Johnston Jr., Phillip Cornwell. 10th ed. USA : McGraw-Hill Education; 2012
- Bedford, Anthony. Engineering mechanics: Statics / Anthony Bedford, Wallace Fowler. 5th ed. USA : Pearson; 2008
- Hibbeler, Russell C. Engineering mechanics: Statics / Russell C. Hibbeler. 13th ed. USA : Prentice Hall; 2012
- Pytel, Andrew. Engineering mechanics: Statics / Andrew Pytel, Jaan Kiusalaas. 3rd ed. USA : Cengage Learning; 2010
- Meriam, J.L. Engineering mechanics: Statics / J. L. Meriam , L. G. Kraige , J. N. Bolton. 8th ed. USA : Wiley; 2014

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- Beer, Ferdinand P. Mecánica vectorial para ingenieros. Estática / Ferdinand P. Beer, E. Russell Johnston, jr., David F. Mazurek; revisión técnica, Javier León Cárdenas, Miguel Ángel Ríos Sánchez, Enrique Zamora Gallardo. 10a ed. México [etc.]: McGraw-Hill Interamericana, cop. 2013.
- Bedford, Anthony. Mecánica para ingeniería: Estática / Anthony Bedford y Wallace Fowler; traducción Jesús Elmer Murrieta Murrieta ; revisión técnica, Miguel Ángel Ríos Sánchez, Alex Elías Zúñiga. 5ª ed. Naucalpan de Juárez

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- Pytel, Andrew. Ingeniería mecánica: Estática / Andrew Pytel, Jaan Kiusalaas. Edición en español México[etc.]: International Thomson Editores, cop. 1999.
- Belmar, F.. Curso de física aplicada: Estática / autores F. Belmar, A. Garmendía, J. Linares; colaborador J.C. Carrión Valencia: Universidad Politécnica, D.L. 1987.
- Hibbeler, Russell C. Ingeniería mecánica: Estática / Russell Hibbeler; traducción Jesús Elmer Murrieta Murrieta ; revisión técnica Felipe de Jesús Hidalgo Cavazos. - 12ª ed. Naucalpan de Juárez (Estado de México): Pearson Educación, 2010.
- Hibbeler, Russell C. Mecánica de materiales / R. C. Hibbeler ; traducción José de la Cera Alonso; revisión técnica Alex Elías Zuñiga. - 6ª ed. México [etc.]: Pearson Educación, 2006.
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