

28606 - Physics II: static structure

Syllabus Information

Academic Year: 2019/20

Subject: 28606 - Physics II: static structure

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 422 - Bachelor's Degree in Building Engineering

ECTS: 6.0

Year: 1

Semester: Second semester

Subject Type: Basic Education

Module: ---

1.General information

1.1.Aims of the course

The foreseen outcomes of this signature are based on the following approaches and objectives:

- Comprehension of the concepts and fundamental laws that rule the Structural Analysis: Statics, recognizing and understanding their right use in different problems found in the Civil Engineering and Architecture.
- Analysis of problems that make up the different aspects of the Structural Analysis: Statics, recognizing the multiple Physics foundations underlying technical implementations, devices and real systems.
- Comprehension of the units of measurements and order of magnitude of the physical magnitudes in use, implementing them in problem solving related to aspects of Engineering and Architecture and using the right numerical values with the right units of measurements.
- Correct use of the basic mathematical methods and reasoning for experimental measurements and simulations processing, expressing and interpreting the gathered data and relating them to their appropriate magnitudes and underlying physical laws.
- Correct use of the bibliography available with a critic mind and focus, using a technical language with clear ideas and concepts in order to explain and debate about issues of the underlying statics and knowledges related to it.
- Correct implementation and use of the multiple equations provided by the Physics under study to fields such as the Civil Engineering and the Architecture.
- Comprehension of the meaning, right use and relationship among the multiple physical magnitudes in use.
- Capability to understand and describe the different type of structures based on the various supports and connections used for two and three dimensional structures, stability conditions, equilibrium and elements among others.

1.2.Context and importance of this course in the degree

Those students enrolled in this subject are going to be very well prepared to face and overcome with success and academic progress the subjects of Structural Analysis and Strength of Materials, given in the following years of this academic degree, and also to implement it to different areas in the Civil Engineering, the Architecture and their professional development.

1.3.Recommendations to take this course

It is advisable for the students to have a good knowledge in General Mechanics, especially in Statics of rigid bodies and fluids, and Mathematics, especially in Linear Algebra, Vector Calculus and Integral and Differential Calculus. Those students enrolled in this subject should have passed with success the subjects related to Physics I and Mathematics I given in the first semester and first course of this academic degree.

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 methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as theory sessions, practice sessions, workshops and tutorials.

A strong interaction between the teacher and the student is promoted. 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.

Regarding to the slides, proposed exercise photocopies, laboratory session guides and other materials used in class, all of them are going to be available on the Moodle platforma of this subject.

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

4.2.Learning tasks

This 6 ECTS (150 hours) course is organized as follows:

- **Theory sessions:** (2 ECTS: 20 h). 4 hours per week. Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the course are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.
- **practice sessions:** (2 ECTS: 20 h) 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:** (1.75 ECTS: 17.5 h). 2 hours per week. This work is tutored by a teacher, in groups of no more than 20 students.
- **Seminar activities:** (0.25 ECTS: 2.5 h) It is tutored by teachers from other subjects of this degree with the purpose to show the students the different applications of Static Structure in Architecture.
- **Autonomous work and study** (90 hours).
 - Study and understanding of the theory taught in the lectures.
 - Understanding and assimilation of the problems and practical cases solved in the practice sessions.
 - 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.
- **Tutorials:** Those carried out giving individual, personalized attention with a teacher from the department. These tutorials may be in person or online.
- **Exams.** 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.

4.3.Syllabus

This course will address the following topics:

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.

- 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

4.4.Course planning and calendar

Estimated timetable of lectures

| Week | Topic | Theme |
|------|-------|--|
| 1 | I | Statics of particles |
| 2 | | |
| 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 communicated to the students in the class room or through the Moodle platform a long time in advance.

Further information concerning the timetable ([calendario y horarios](#)), classroom, office hours, assessment dates ([exámenes](#)) and other details regarding this course will be provided on the first day of class or please refer to the Faculty of EUPLA website and Moodle.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28606&year=2019