Course guide
390236 - F - Physics

Last modified: 03/06/2024

Unit in charge: Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit: 748 - FIS - Department of Physics.

Degree: BACHELOR'S DEGREE IN LANDSCAPE ARCHITECTURE (Syllabus 2019). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Pineda Soler, Eloi

Others: Prats Soler, Clara
Perramon Malavez, Aida

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE-PS-20. (ENG) Dominar los conceptos básicos sobre las leyes generales de la estática, mecánica de fluidos y electromagnetismo para aplicarlos a la resolución de problemas propios de la ingeniería.

Transversal:
CT4. (ENG) Trabajo en equipo. Ser capaz de trabajar como miembro de un equipo interdisciplinar, ya sea como un miembro más o realizando tareas de dirección, con la finalidad de contribuir a desarrollar proyectos con pragmatismo y sentido de la responsabilidad, asumiendo compromisos teniendo en cuenta los recursos disponibles.

TEACHING METHODOLOGY

The classes will consist of the introduction by the teacher of the concepts necessary to achieve the objectives of the subject. Examples of applying these concepts to solving problems will also be presented. The small group classes will consist of problem solving sessions or laboratory sessions, in which the students will work in teams and the teacher will guide them during the activity. Students' ability to work in teams and problem solving will be strengthened. The course support material includes lab scripts, problem collections, and notes. This material will be available at ATENEA.

LEARNING OBJECTIVES OF THE SUBJECT

The course aims to give the student basic knowledge of fluids, static mechanics and electrical circuits. The student must be able to solve problems and questions related to all of these topics and be able to apply this knowledge in later subjects, in particular the one related to the technological foundations of engineering and design of facilities and constructions. At the same time, the student must have an overview of science and the scientific method, must be able to apply dimensional analysis to the solution of problems and the verification of results, and must master the different calculation techniques which are introduced into the subject. It is also intended that the student becomes familiar with the laboratory work, uses the material correctly and knows how to proceed with scientific rigor when taking, treating and presenting experimental data.

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	20,0	13.33
Hours large group	40,0	26.67

Total learning time: 150 h

CONTENTS

Fluid mechanics (Fundamentals for hydraulics and irrigation technologies)

Description:
1.0 Introduction to the subject
1.1 Properties of fluids. Pressure and gravity. Principles of Pascal and Archimedes
1.2 Surface tension. Adhesion and cohesion forces
1.4 Ideal fluids in motion. Continuity. Bernoulli equation
1.5 Viscous fluids in motion. Laminar and turbulent losses
1.6 Generalized Bernoulli equation. Basic hydraulic circuits

Full-or-part-time: 48h
Theory classes: 12h
Laboratory classes: 6h
Self study : 30h

Statics (Fundamentals for construction and projects)

Description:
2.1 Vectors. Components and operations with vectors
2.2 Point equilibrium
2.3 Moment of a force and equilibrium of a solid
2.4 Centers of mass and distributed forces
2.5 Structures
2.6 Beams

Full-or-part-time: 50h
Theory classes: 14h
Laboratory classes: 6h
Self study : 30h

Electricity and Magnetism (Foundations of electrotechnics and lighting)

Description:
3.1. Electric field
3.2. Intensity, potential, resistance and Ohm's law
3.3. Capacitors and coils
3.4. Electric circuits
3.5. Electromagnetic spectrum, light and fundamentals of lighting

Full-or-part-time: 52h
Theory classes: 14h
Laboratory classes: 8h
Self study : 30h

GRADING SYSTEM

The student will do:
2 written tests (N1 and N2)
10 guided sessions of problem solving or laboratory, which will be evaluated
The two written tests will be performed in mid (first partial exam, N1) and end of semester (second partial exam, N2). There will be the opportunity to repeat the first part (N1) at the end of the semester.
The set N1 and N2 will represent 60% of the final grade.
The set of problems and laboratory sessions will be graded (N3), and will represent 40% of the final grade.
Evaluable questionnaires will be available in ATENEA to qualify for the problem sessions. Laboratory practices will be evaluated through the corresponding report.

BIBLIOGRAPHY

Basic:

- Tipler, Paul Allen; Mosca, Gene. Física per a la ciència i la tecnologia(VOL. 1) [on line]. Barcelona [etc.]: Reverté, 2010 [Consultation: 17/07/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=10372. ISBN 9788429144314.
- Beer, Ferdinand Pierre; Villalobos, Salvador; Murrieta Murrieta, Jesús Elmer. Mecánica vectorial para ingenieros(VOL. 1) [on line]. Undécima edición. México: McGraw-Hill Education, [2017] [Consultation: 16/07/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=11980. ISBN 9781456255268.
- Tipler, Paul Allen; Mosca, Gene. Física per a la ciència i la tecnologia(VOL. 2) [on line]. Barcelona [etc.]: Reverté, 2010 [Consultation: 17/07/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=10373. ISBN 9788429144338.