

Course guide 220022 - TE - Structural Theory

Unit in charge: Teaching unit:	Terrassa School of Industr 737 - RMEE - Department	Last modified: 02/04/2024 al, Aerospace and Audiovisual Engineering of Strength of Materials and Structural Engineering.
Degree:	BACHELOR'S DEGREE IN A BACHELOR'S DEGREE IN A	EROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject). EROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).
Academic year: 2024	ECTS Credits: 7.5	Languages: Catalan, Spanish

LECTURER				
Coordinating lecturer:	Rafael Weyler Pérez			
Others:	Fruitos Bickham, Oscar Alejandro Alegre Carrasquer, Daniel Martínez Piñol, José Ramón			

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. GrETA/GrEVA - An understanding of the behaviour of structures under stress in ordinary and extreme conditions.

2. GrETA/GrEVA - An adequate understanding of the following, as applied to engineering: principles of continuum mechanics and techniques for calculating response.

TEACHING METHODOLOGY

It is divided into three parts:

 \cdot Theory lessons where the basic concepts are developed. They took place in the classroom and it is used the expositive method.

 \cdot Exercises lessons, where the theoretical concepts are applied to the resolution of practical examples. It takes place in the classroom, in smaller groups than the ones of theory lessons.

• Laboratory practices, where, in reduced groups and in a guided way, the students get in contact with the experimental methodology At the same time, it will be proposed the realization of problems and exercises, as well as the elaboration of a laboratory report that has to be made out of the class hours.

LEARNING OBJECTIVES OF THE SUBJECT

Get the student to understand the behaviour of the structures and resistant structures and to be able of design a structure that is capable of support the efforts that the structures are brought under in good conditions, facing breaking and with deformations compatible with their functionality.

STUDY LOAD

Туре	Hours	Percentage
Hours large group	47,0	25.07
Hours small group	7,0	3.73
Hours medium group	21,0	11.20
Self study	112,5	60.00

Total learning time: 187.5 h



CONTENTS

1. Elasticity fundaments.

Description:

Full-or-part-time: 65h 30m Theory classes: 15h Practical classes: 7h 30m Laboratory classes: 3h Self study : 40h

2. Prismatic part: Study of the straight section.

Description:

Full-or-part-time: 65h 30m Theory classes: 15h Practical classes: 7h 30m Laboratory classes: 3h Self study : 40h

3. Prismatic part: behaviour.

Description:

Full-or-part-time: 31h Theory classes: 7h Practical classes: 6h Laboratory classes: 2h Self study : 16h

4. Structure calculus

Description:

Full-or-part-time: 25h 30m Theory classes: 8h Practical classes: 1h 30m Self study : 16h

ACTIVITIES

THEORY SESSIONS

Full-or-part-time: 77h Self study: 35h Theory classes: 42h



PROBLEM SESSIONS

Full-or-part-time: 71h Self study: 50h Practical classes: 21h

LABORATORY SESSIONS

Full-or-part-time: 19h 30m Self study: 12h 30m Laboratory classes: 7h

ACTIVITY

Full-or-part-time: 15h Self study: 15h

EXAMS

Full-or-part-time: 5h Theory classes: 5h

GRADING SYSTEM

Laboratory practices: 10% Partial exam: 30% Final exam: 50% Proposed activity 10% It will be a method to recover unsatisfactory results in the partial exam.

EXAMINATION RULES.

The laboratory practices along with the laboratory reports are mandatory to pass the subject.

BIBLIOGRAPHY

Basic:

- Cervera, M.; Blanco, E. Mecánica de estructuras [on line]. 2ª ed. Barcelona: Edicions UPC, 2002 [Consultation: 19/05/2020]. Available on: <u>http://hdl.handle.net/2099.3/36196</u>. ISBN 848301517X.

- Ortiz Berrocal, L. Elasticidad [on line]. 3^a ed. Madrid: McGraw-Hill, 1998 [Consultation: 17/06/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=3965. ISBN 8448120469.

- Ortiz Berrocal, L. Resistencia de materiales [on line]. 3ª ed. Madrid: McGraw-Hill, 2007 [Consultation: 09/11/2020]. Available on: https://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=3962. ISBN 9788448156336.

- Miroliúbov, I [et al.]. Problemas de resistencia de materiales. 6ª ed. Moscú: Mir, 1990. ISBN 503000873X.

Complementary:

- Feodosev, V. I. Resistencia de materiales. 2ª ed. Moscú: Mir, 1980.

- Gere, J. M.; Timoshenko S. P. Resistencia de materiales. 5ª ed. España: International Thomson, 2002. ISBN 9788497320658.

- Rivello, R. M. Theory and analysis of flight structures. New York: McGraw-Hill, 1969. ISBN 007052985X.



- Megson, T. H. G. Aircraft structures for engineering students [on line]. 5th ed. Amsterdam: Elsevier Butterworht Heinemann, 2013 [Consultation: 10/06/2022]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780080969053/aircraft-structures-for-engineering-students. ISBN 0080969062.