

220022 - Structural Theory

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering	
Teaching unit:	737 - RMEE - Department of Strength of Materials and Structural Engineering	
Academic year:	2019	
Degree:	BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)	
ECTS credits:	7,5	Teaching languages: Spanish

Teaching staff

Coordinator:	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:

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



220022 - Structural Theory

Study load

Total learning time: 187h 30m	Hours large group:	47h	25.07%
	Hours medium group:	21h	11.20%
	Hours small group:	7h	3.73%
	Self study:	112h 30m	60.00%

220022 - Structural Theory

Content

<p>1. Elasticity fundamentals.</p>	<p>Learning time: 65h 30m Theory classes: 15h Practical classes: 7h 30m Laboratory classes: 3h Self study : 40h</p>
<p>Description:</p> <p>.</p>	
<p>2. Prismatic part: Study of the straight section.</p>	<p>Learning time: 65h 30m Theory classes: 15h Practical classes: 7h 30m Laboratory classes: 3h Self study : 40h</p>
<p>Description:</p> <p>.</p>	
<p>3. Prismatic part: behaviour.</p>	<p>Learning time: 31h Theory classes: 7h Practical classes: 6h Laboratory classes: 2h Self study : 16h</p>
<p>Description:</p> <p>.</p>	
<p>4. Structure calculus</p>	<p>Learning time: 25h 30m Theory classes: 8h Practical classes: 1h 30m Self study : 16h</p>
<p>Description:</p> <p>.</p>	

220022 - Structural Theory

Planning of activities

THEORY SESSIONS	Hours: 77h Theory classes: 42h Self study: 35h
PROBLEM SESSIONS	Hours: 71h Practical classes: 21h Self study: 50h
LABORATORY SESSIONS	Hours: 19h 30m Laboratory classes: 7h Self study: 12h 30m
ACTIVITY	Hours: 15h Self study: 15h
EXAMS	Hours: 5h Theory classes: 5h

Qualification 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.

Regulations for carrying out activities

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

220022 - Structural Theory

Bibliography

Basic:

Cervera M.; Blanco E. Mecánica de estructuras [on line]. 2ª ed. Barcelona: Edicions UPC, 2002 [Consultation: 08/01/2016]. Available on: <<http://hdl.handle.net/2099.3/36196>>. ISBN 848301517X.

Ortiz Berrocal, L. Elasticidad. 3ª ed. Madrid: McGraw-Hill, 1998. ISBN 8448120469.

Ortiz Berrocal, L. Resistencia de materiales. 3ª ed. Madrid: McGraw-Hill, 2007. 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]. 4th ed. Amsterdam: Elsevier Butterworth Heinemann, 2007 [Consultation: 16/05/2014]. Available on: <<http://www.sciencedirect.com/science/book/9780080969053>>. ISBN 9780750667395.