

Academic Year: ( 2019 / 2020 )

Review date: 02-06-2020

Department assigned to the subject: Continuum Mechanics and Structural Analysis Department

Coordinating teacher: VAZ-ROMERO SANTERO, ALVARO

Type: Electives ECTS Credits : 3.0

Year : Semester :

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Mechanics of Structures  
Elasticity  
Strength of Materials

**OBJECTIVES**

Knowledge of the basic tools for the analysis of one-dimensional thin-walled elements, such as industrial robot arms or shafts, and other tubular structures.  
Knowledge of the basic techniques of the design of lightweight structures made with composite laminated and sandwich beams, used in various engineering fields such as aerospace or transportation.  
Knowledge of the basic concepts for the calculation of two-dimensional structural elements such as pipes, tanks and other pressurized structures.  
Capacity to analyse light structures, to assess the hypotheses and to interpret the results.

**DESCRIPTION OF CONTENTS: PROGRAMME**

Chapter 1. Bending of thin-walled beams

Chapter 2. Torsion of thin-walled shafts

Chapter 3. Introduction to composites laminated and sandwich beams

Chapter 4. Introduction to the theory of elastic plates

Chapter 5. Introduction to the theory of elastic shells

**LEARNING ACTIVITIES AND METHODOLOGY**

Lecture sessions (master class) and practical sessions (in reduced groups) will be taught. The first is geared to the acquisition of theoretical knowledge, and the second to the acquisition of practical skills related to theoretical concepts. In addition to this sessions one laboratory practical session in reduced groups (maximum 20 students) will be impart.

Additionally, tutorial sessions in group may be taught.

**ASSESSMENT SYSTEM**

Final exam (mandatory): 40%  
Continuum evaluation: 60%  
- Laboratory: 30%  
- Evaluation controls: 30%

<b>% end-of-term-examination:</b>	40
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	60

**BASIC BIBLIOGRAPHY**

- Megson, T.H.G. Aircraft structures for engineering students, Elsevier, 2007
- Timoshenko, S.P. Teoría de placas y láminas, Urmo, 1975

#### ADDITIONAL BIBLIOGRAPHY

- Ugural, A. C. Stresses in beams, plates, and shells, Taylor & Francis, 2009
- Vinson, J. R. The Behavior of thin walled structures: beams, plates, and shells, Kluwer Academic Publishers, 1989