

Lightweight Structures

Academic Year: (2019 / 2020)

Review date: 02/06/2020 16:36:03

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

Coordinating teacher: VAZ-ROMERO SANTERO, ALVARO

Type: Electives ECTS Credits : 3.0

Year : 4 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

% end-of-term-examination/test:	40
% of continuous assessment (assignments, laboratory, practicals...):	60
Final exam (mandatory):	40%
Continuum evaluation:	60%
- Laboratory:	30%
- Evaluation controls:	30%

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