

Academic Year: ( 2022 / 2023 )

Review date: 07/09/2021 10:54:53

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

Coordinating teacher: RODRIGUEZ MARTINEZ, JOSE ANTONIO

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

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

Calculus I  
Calculus II  
Linear Algebra

**OBJECTIVES**

Introduction of the basic concepts of continuum mechanics for the analysis of elastic and viscoelastic solids.  
Ability to formulate fundamental problems of solids mechanics, assessing the hypothesis and interpreting their results

**DESCRIPTION OF CONTENTS: PROGRAMME**

Chapter 1. Introduction to continuum mechanics applied to living and inert solids  
Chapter 2. Stress, strain and compatibility conditions  
Chapter 3. Derivation of the field equations and boundary conditions  
Chapter 4. Properties of most common solids  
Chapter 5. Constitutive equations of continuum mechanics: elasticity  
Chapter 6. Constitutive equations of continuum mechanics: viscoelasticity

**LEARNING ACTIVITIES AND METHODOLOGY**

Every week a keynote lecture (large group) and a practical session (small group) will be delivered. The former is aimed at the acquisition of theoretical knowledge and the latter is aimed at the acquisition of practical skills related to theoretical concepts. Additionally, two lab sessions will be delivered in specific time in small groups (maximum 20 students).

The students will have the possibility of personal tutorials on the corresponding schedule. There will be a collective mentoring session at the 15th week of the calendar at the time scheduled for the keynote lecture.

**ASSESSMENT SYSTEM**

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

End of term examination (mandatory): 60%

- The minimum mark on the final examination for taking into account the mark obtained during the continuous assessment is 4.5 over 10

Continuous assessment: 40% split up into:

- Lab sessions: 15%
- 2 Mid-term exams: 25%

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

It is mandatory attendance and completion of the laboratory classes provided in the weekly planning to pass the course. The weight of the mark of the lab sessions in the continuous assessment corresponds to what is established in the course, in accordance with the university regulations. In the course "Biomechanics of Continuum Media I", the weight of the laboratory classes takes the value of 37.5% of the continuous assessment mark.

In addition, 3 extra-exercises will be proposed to be carried out voluntarily, which will be graded by the teacher, whose grade will be 0.5 points each to be added to the final grade of the course ONLY in case the subject has been passed.

#### BASIC BIBLIOGRAPHY

- Federico Paris Carballo Teoría de la elasticidad, Universidad de Sevilla, 1998
- Flügge Wilhelm Viscoelasticity, Springer-Verlag .
- Oliver, X.; Agelet, C. Mecánica de medios continuos para ingenieros, UPC.
- Ortiz Berrocal, L Elasticidad, Ed. McGraw Hill.
- SAMARTIN, A Curso de Elasticidad, Bellisco, 1990

#### BASIC ELECTRONIC RESOURCES

- Bob McGinty . Continuum Mechanics: <http://https://www.continuummechanics.org/>
- XAVIER OLIVER . CONTINUUM MECHANICS FOR ENGINEERS:  
<http://http://oliver.rmee.upc.edu/xo/vpage/1/0/Teaching/Continuum-Mechanics>
- Allan F. Bower . Applied Mechanics of Solids: <http://http://solidmechanics.org/>