

Strength of Materials

Academic Year: (2023 / 2024)

Review date: 22-04-2023

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

Coordinating teacher: GARCIA CASTILLO, SHIRLEY KALAMIS

Type: Compulsory ECTS Credits : 6.0

Year : Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

We strongly advise you not to take this course if you have not passed Physics, Algebra, Calculo and Applied Mechanics

OBJECTIVES

The powers intended that students acquire are:

- Understand basic concepts related to the principles of Solid Mechanics and its application to the analysis of deformable solids. Being able to raise the general equations of Elasticity with appropriate boundary conditions and determine the extent of the hypotheses considered.

This requires achieving learning outcomes are summarized below:

- Calculate stress and strain tensor associated with elastic and elastic-plastic problem.
- Solve the methodology correct basic problems of Strength of Materials, obtaining the variables of interest the real problem.
- Skills on Solid Mechanics
- Applications on Elasticity
- Skills on Strength of Materials.

DESCRIPTION OF CONTENTS: PROGRAMME

Force systems and equilibrium.
Reaction forces.
Force Diagrams and Laws.

Introduction to Solid Mechanics theory.
Stress and Strain.
Constitutive equations.
Elastic problem
2D simplification
Plasticity criteria.

Introduction to Strength of Materials.
General study of structural behaviour of cross section strength.
Forces and movements in beams.

LEARNING ACTIVITIES AND METHODOLOGY

The 50% of the formative activities are oriented to the acquisition of theoretical knowledge. The remaining activities (50%) are oriented to the acquisition of practical capabilities in relation to the subject program.

- Master lectures, sessions of problems resolution, student presentations, individual sessions, and personal student work for theoretical knowledge (3 ECTS).
- Practical sessions of laboratory and sessions of problems, individual sessions, and personal student work for practical knowledge (3 ECTS).

ASSESSMENT SYSTEM

50% (continuum evaluation) , 50%(final exam).

% end-of-term-examination:	50
% of continuous assessment (assignments, laboratory, practicals...):	50

BASIC BIBLIOGRAPHY

- F.P. Beer, E. Russel Johnston, Mecánica Vectorial para Ingenieros, Vol.1 Estática, , McGraw Hill, 1994
- Garrido, J.A. y Foces, A. Resistencia de Materiales. , Secretariado de Publicaciones. Universidad de Valladolid. , 1994
- Ortiz Berrocal, L . Elasticidad, Ed. McGraw Hill. , 1998
- R.C. Hibbeler Ingeniería Mecánica, Vol. Estática. , Prentice Hall, 1996
- Samartin Quiroga, A. Resistencia de Materiales, Colegio Oficial de Ingenieros de Caminos, Canales y Puertos, 1995
- Sanmartín Quiroga, A. Curso de Elasticidad, Ed. Bellisco, 1990

ADDITIONAL BIBLIOGRAPHY

- Benham, P.P. y Crawford, R.J. . Mechanics of engineering materials. , Longman Scientific & Technical. , 1987
- Doblaré Castellano, M. y Gracia Villa, L. Fundamentos de la Elasticidad Lineal. , Ed. Síntesis., 1998
- Oliver, X.; Agelet, C. Mecánica de medios continuos para ingenieros., Edid. UPC. , 2000
- Paris Carballo, F. Teoría de la elasticidad. , Ed. Grupo de Elasticidad y Resistencia. , 1998