Professional Software in Solid Mechanics

ECTS: 6 ECTS

COORDINATOR: María Luisa Seoane Martínez (marialuisa.seoane@usc.es)

UNIVERSITY WHERE THE COORDINATOR IS: USC

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 1: José Ramón Fernández García (jose.fernandez@uvigo.es)

UNIVERSITY WHERE THE LECTURER 1 IS: UVigo

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

SUBJECT CONTENTS

1. Linear elasticity.

      1.1. Three-dimensional elasticity.

      1.2. One-dimensional models (beam and rod) y two-dimensional models (plate,

shell and membrane). Combined beam and plate structures.

      1.3. Normal modes and frequencies of vibration.

      1.4. Linear thermoelasticity.

2. Nonlinear problems.

      2.1 Nonlinear material laws: hyperelasticity, viscoelasticity and plasticity.

      2.2. Contact problems: Contact between a deformable body and a rigid foundation,

Contact between two deformable bodies.

      2.3. Fracture mechanics. Elastic cracked bodies.

3. Industry applications: extrusion and drilling processes.

METHODOLOGY

1- Presentation of physical problems: mathematical formulation and analytical solution.

2- Planning of tasks that can solved using the course software (PATRAN-NASTRAN and MENTAT-MARC).

3- To solve using computers some of these problems.

LANGUAGE USED IN CLASS: Spanish

IS IT COMPULSORY TO ATTEND CLASS? Students can attend via conference system.

BIBLIOGRAPHY

Bower, A.F. (2010) Applied Mechanics of Solids. CRC Press.

Kikuchi, N.,Oden, J.T. (1988) Contact problems in elasticity. SIAM.

Lemaitre, J., Chaboche, J.L. (1994) Mechanics of solids materials. Cambridge University Press.

Timoshenko, S., Goodier,J.N. (1975) Teoría de la elasticidad. URMO.

SKILLS

Basic:

CG1: To have knowledge that provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context, knowing how to translate industrial needs in terms of R & D in the field of mathematics Industrial.

CG4: To have the ability to communicate the findings to specialist and non-specialist audiences in a clear and unambiguous way.

Specific:

CE4: To be able to select a set of numerical techniques, languages and tools, appropriate to solve a mathematical model.

CE5: To be able to validate and interpret the results, comparing them with visualizations, experimental measurements and functional requirements of the physical engineering system.

Numerical specialization:

CS1: To know, be able to select or use how to handle most suitable professional software tools (both commercial and free) for the simulation of processes in the industrial and business sector.

CS2: To adapt, modify and implement software tools for numerical simulation.

WILL YOU BE USING A VIRTUAL PLATFORM? No.

WILL YOU BE USING ANY SPECIFIC SOFTWARE? Yes. PATRAN-NASTRAN and MENTAT-MARC

CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY

Students can choose between:

 - continuous evaluation: 40% essays & 60% exam

  -100% exam

CRITERIA FOR THE 2ND ASSESSMENT OPPORTUNITY

100% exam