

DIM-GITI-322 Mechanics of Materials

SEMESTER: Spring
CREDITS: 7.5 ECTS (5 hrs. per week)
LANGUAGE: Spanish
DEGREES: GITI

Course overview

This course is an introduction to Mechanics of Materials. Students will learn to size and to compute displacements in beams and bars under axial, bending and torsional moments.

Prerequisites

Courses on Solid Rigid Mechanics, Algebra and Calculus.

Course contents

Theory:

1. Stress state. Equilibrium equations. Stress tensor. Principal components. Mohr's circle for the stress state.
2. Strain state. Compatibility equations. Strain tensor. Principal components. Mohr's circle for the strain state.
3. Materials behavior. Constitutive equations. Stress-Strain diagram. Hook's Law. Modulus of elasticity.
4. Yield criteria.
5. Stress and strain due to axial forces. Equations of compatibility and equilibrium. Analysis of statically indeterminate bars.
6. Stress and strain due to bending. Equations of compatibility and equilibrium. Analysis of statically indeterminate beams.
7. Stress and strain due to torsion. Circular shapes.
8. Buckling. Simple buckling of bars.

Textbook

- F.P. Beer, E. R. Johnston and J.T DeWolf. Mechanics of Materials. McGraw-Hill.

Grading

The following conditions must be accomplished to pass the course:

- A minimum overall grade of at least 5 over 10.
- A minimum grade in the final exam of 4 over 10.

The final grade of the course will result from the weighted average of:

- Exams 75% (60% final exam, 15% intermediate exam).
- Continuous assessment (25%). Problem solving via web and report of calculations, test, etc.

In the extraordinary exam, the student will be examined of the whole syllabus.

The weighting criterion is:

- 85% Extraordinary exam (minimum 4 over 10).
- 15% Continuous assessment (of the course).