

Structural Integrity

Academic Year: (2022 / 2023)

Review date: 28/05/2022 18:49:14

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)

Elasticity
Strength of Materials.

OBJECTIVES

Knowledge of the basic techniques for the structural integrity of solids under different load conditions, which fundament the formation of the Mechanical Engineer.
Capacity to analyse structures, to assess the hypotheses and to interpret the results.

DESCRIPTION OF CONTENTS: PROGRAMME

Basic concepts on structural stability.
1. Introduction.
Elastoplastic fracture mechanics
2. Fracture criteria on elastic linear materials
3. Basic concepts on dynamic fracture dynamics
4. Fracture criteria on elastoplastic materials
Fatigue crack propagation
5. Fatigue behavior
6. Fatigue life calculation on mechanical components
7. Structural integrity at high temperature
7. Fatigue and fracture tests
Experimental techniques and numerical simulation
10. Design in fatigue and fracture.
11. Numerical methods in fatigue and fracture problems.
10. Standards in fracture and fatigue.

LEARNING ACTIVITIES AND METHODOLOGY

In each week one lecture session (master class) and one practical session (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.

ASSESSMENT SYSTEM

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

Final exam (obligatory): 40%

Continuum evaluation: 60%

- Laboratory: 20%

- Evaluation controls: 40%

In order to pass the course, attendance and successful completion of the laboratory practices foreseen

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% of continuous assessment (assignments, laboratory, practicals...):	60

in the weekly planning are mandatory. The weighting of the laboratory practice mark in the continuous assessment corresponds to what it is established in the course, in accordance with the regulations of the university. In this course, the weighting of the laboratory practices takes the value of 20% of the continuous assessment grade.

BASIC BIBLIOGRAPHY

- Anderson, T.L. Fracture mechanics: Fundamentals and applications , CRC Press, 1995
- Anglada, M.J. Fractura de materiales , UPC, 2002
- Broek, David Elementary engineering fracture mechanics, Kluwer Academic, 1991

ADDITIONAL BIBLIOGRAPHY

- K. Ravi-Chandar Fracture mechanics, Springer, 1998
- Kanninen, Melvin F. Advanced fracture mechanics, Oxford University Press, 1985