The finite element method in solid mechanics

Academic Year: (2020 / 2021) **Review date: 13-07-2020**

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

Coordinating teacher: VADILLO MARTIN, GUADALUPE

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Students should have knowledge of Elasticity and Strength of Materials.

OBJECTIVES

Basic knowledge of the fundamentals and development of Finite Element Method (FEM).
Ability to formulate the most suitable mathematical model of a generic structure under various stresses.
Ability to build a finite element model from the physical model.
Ability to interpret critically the results of the analysis.

Results
After passing the course the student is expected to be able to:
- Know the basics and the formulation of the MEF,
- Modeling for analysis of different types structures with proper selection of element types to use,
- Develop appropriate mesh finite element
- Correctly modeling constraints and stresses
- Interpret the analysis results.

DESCRIPTION OF CONTENTS: PROGRAMME

1 Bases and fundamentals of the Finite Element Method
2 Application of M.E.F. in elastic problems
3 Application of M.E.F. in nonlinear problems
4 Application of M.E.F. in dynamic problems
5 Application of M.E.F. in fracture problems
6 Implementation of M.E.F.
7 Coupling systems
8 Using M.E.F. Commercial codes

LEARNING ACTIVITIES AND METHODOLOGY

The training activities include:
- Lectures, doubt solving classes in small groups, student presentations, individual tutorials and personal work, including studies, tests and trials aimed at the acquisition of theoretical knowledge.
- Classes of problems, individual tutorials and personal work, including study, tests and examinations, aimed at the acquisition of practical skills related to the course.

ASSESSMENT SYSTEM

The evaluation system includes continuous evaluation of student work (papers, class participation and skills and theoretical and practical knowledge assessment tests), and evaluation through a final exam in which be evaluated comprehensively the knowledge, skills and abilities acquired during the course. The percentages of each evaluation are:
- Overall assessment of knowledge through written examination, to a maximum of 60% of the final grade.
- Evaluation of individual work and continuous assessment, to a minimum of 40% of the final grade
-In order to pass the course, the student must have a minimum grade in the final exam of 4.0

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40