

Mondragon Unibertsitatea Goi Eskola Politeknikoa Escuela Politécnica Superior

Course: 2023 / 2024 - Course planning [MHG202] INTRODUCTION TO THE FINITE ELEMENT METHOD **GENERAL INFORMATION** Studies UNIVERSITY MASTER IN INDUSTRIAL Subject ? ENGINEERING Semester 1 Mention / Field of ??? Course 2 specialisation Character OPTIONAL Plan 2022 Modality Face-to-face Language ENGLISH Total hours 33 class hours + 42 non-class hours = 75 total Credits 3 Hours/week 1.83 hours PROFESSORS ESNAOLA RAMOS, JON ANDER TELLERIA ARIZTIMUÑO, XUBAN REQUIRED PREVIOUS KNOWLEDGE Subjects Knowledge Fundamentals of Mathematics (No specific previous subjects required) Fundamentals of Physics Material's Resistance and Elasticity Mechanical Design CAD 3D LEARNING RESULTS LEARNING RESULTS MHME01 - To design and carry out machine tests considering the mechanical behavior of the material MHME04 - To demonstrate knowledge and capabilities for the calculation and design of structures using

finite elements		
MHRA22 - To demonstrate knowledge and capabilities to carry out verification and control of facilities,	x	0,08
processes and products		
MHRA23 - To demonstrate knowledge and capabilities to carry out certifications, audits, verifications, tests and reports	X	0,12
MHRA27 - To demonstrate the ability to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on the social, health and safety, environmental, economic and industrial implications and responsibilities.	x	0,08
MHRA28 - To communicate your conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way	x	0,16
MHR126 - To apply the knowledge acquired and your problem-solving skills in new, little-known or changing environments within broader (or multidisciplinary) contexts related to your area of study	x	0,08
MHR129 - To possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous	x	0,08
	Total:	3
KC: Knowledge or Content / SK: Skills / AB: Abilities		
ENAEE LEARNING RESULTS		ECTS
ENA123 - Knowledge and comprehension: Deep knowledge and comprehension of mathematics and other basi inherent in their engineering speciality, allowing them to achieve the other competencies of the degree.	c sciences	0,5
ENA131 - Engineering projects: Ability to project, develop and design new complex products (parts, components products, etc.), processes and systems with specifications defined incompletely and/or with conflicts, which requiregration of knowledge from different disciplines, and consider social, health and safety, environmental, economic industrial aspects; to select and apply the appropriate methodologies or employ creativity to develop new project methodologies.	s, finished uire the omic and t	0,5
ENA134 - Research and innovation: Ability to carry out bibliographic searches and consult and use databases a information sources with discretion, in order to carry out simulations with the aim of conducting research on contheir speciality.	nd other aplex topics of	0,5
ENA138 - Practical application of engineering: Complete knowledge of the applicable techniques and methods of project and research, as well as their limitations.	f analysis,	0,4
ENA145 - Preparation of judgements: Ability to manage complex technical or professional activities or projects the new approach approaches, assuming responsibility for the decisions made.	nat require	0,6
ENA146 - Communication and Teamwork: Ability to employ different methods to communicate their conclusions unambiguously, and the knowledge and logical foundations that support them, to audiences specialised and no in the issue, in domestic and international contexts.	, clearly and t specialised	0,5

Total:

3

кс

SK

x

x

AB

ECTS

0.6

1,8

CONTENTS

1. Introduction





- 2. Simulation procedure map
- 3. Geometry adaptation
- 4. Discretization
- 5. Material modeling
- 6. Interactions and constraints
- 7. Loads and boundary conditions
- 8. Solver
- 9. Post-processing

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Slides of the subject	Oñate, E. (2009). Structural Analysis with the Finite Element Method.
Moodle Platform	Linear Statics. Volume 1. Basis and Solids. CIMNE
Specific Master Software	Chandrupatla, T. R. et al. (2012). Introduction to finite elements in engineering. Pearson Education.
Computer practical training	Zienkiewicz, O. C. and Taylor, R. L. (1995). El método de los elementos finitos. Vol 1. McGraw Hill.
	Liu, G. R. and Quek, S. (2003). Finite element method. A practical course. Butterworth-Heinemann.