[MHE203] LABORATORY OF STRUCTURAL INTEGRITY I

GENERAL INFORMATION

Studies	UNIVERSITY MASTER IN INDUSTRIAL ENGINEERING			**Subject**	?
Semester	1	**Course**	1	**Mention / Field of specialisation**	
Character	OPTIONAL				
Plan	2022	**Modality**	Face-to-face	**Language**	CASTELLANO/ENGLISH
Credits	3	**Hours/week**	1.89	**Total hours**	34 class hours + 41 non-class hours = **75 total hours**

PROFESSORS

ESNAOLA RAMOS, JON ANDER
MCCLOSKEY GOMEZ, ALEX

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	[!] *Fundamentos de Vibraciones*
	[!] *Fundamentos de Elementos Finitos*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MHME02 - To design and perform machine tests including their dynamic behavior		x		1,12
MHME04 - To demonstrate knowledge and capabilities for the calculation and design of structures using finite elements		x		1,08
MHRA22 - To demonstrate knowledge and capabilities to carry out verification and control of facilities, processes and products		x		0,08
MHRA23 - To demonstrate knowledge and capabilities to carry out certifications, audits, verifications, tests and reports		x		0,16
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
MHRA30 - To work with people, involving and directing them in a dynamic aimed at a common objective that includes reflection on their ethical and social responsibility, with a global vision of the work to be carried out and the characteristics that it requires (quality, deadlines,...), assuming responsibility for the decisions made		x		0,08
MHR125 - To possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context		x		0,08
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 basic sciences inherent in their engineering speciality, allowing them to achieve the other competencies of the degree.	0,3
ENA124 - Knowledge and comprehension: Deep knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree.	0,25
ENA127 - Analysis in engineering: Ability to analyse new and complex engineering products, processes and systems within a broader multidisciplinary context; select and apply the most appropriate analysis, calculation and experimental methods already established, as well as innovative methods; and critically interpret the results of such analyses.	0,3
ENA128 - Analysis in engineering: Ability to conceive new products, processes, and systems.	0,35
ENA131 - Engineering projects: Ability to project, develop and design new complex products (parts, components, finished products, etc.), processes and systems with specifications defined incompletely and/or with conflicts, which require the integration of knowledge from different disciplines, and consider social, health and safety, environmental, economic and industrial aspects; to select and apply the appropriate methodologies or employ creativity to develop new project methodologies.	0,25
ENA134 - Research and innovation: Ability to carry out bibliographic searches and consult and use databases and other information sources with discretion, in order to carry out simulations with the aim of conducting research on complex topics of their speciality.	0,25
ENA135 - Research and innovation: Ability to consult and apply codes of good practices and security in their speciality.	0,25
ENA136 - Research and innovation: High-level capacity and ability to project and carry out experimental investigations, interpret data with criteria, and draw conclusions.	0,25
ENA138 - Practical application of engineering: Complete knowledge of the applicable techniques and methods of analysis, project and research, as well as their limitations.	0,25
ENA141 - Practical application of engineering: Ability to apply standards of engineering practice.	0,25

ENA145 - Preparation of judgements: Ability to manage complex technical or professional activities or projects that require new approach approaches, assuming responsibility for the decisions made. 0,3

Total: 3

SECONDARY LEARNING RESULTS

RMH157 **[!]** ***Conoce y aplica los conceptos de vibraciones en sistemas reales con n gdl considerando vibraciones aleatorias***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		4 h.	4 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.		1 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		16 h.	16 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	3 h.		3 h.
Tutoring sessions and monitoring of training activities	13 h.		13 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	60%	Individual written and/or oral tests or individual coding/programming tests
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	40%	

CH - Class hours: 17 h.
NCH - Non-class hours: 20 h.
TH - Total hours: 37 h.

RMH158 **[!]** ***Conoce y aplica, en casos reales, los conceptos del método de los elementos finitos en dinámica estructural***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		4 h.	4 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints		1 h.	1 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		16 h.	16 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	4 h.		4 h.
Tutoring sessions and monitoring of training activities	13 h.		13 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	60%	Individual written and/or oral tests or individual coding/programming tests
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	40%	

CH - Class hours: 17 h.
NCH - Non-class hours: 21 h.
TH - Total hours: 38 h.

CONTENTS

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Slides of the subject
Moodle Platform
Labs
Computer practical training
Class presentations
Specific Master Software

Bibliography

Oñate, E. (2009). Structural Analysis with the Finite Element Method. Linear Statics. Volume 1. Basis and Solids. CIMNE.

Chandrupatla, T. R. et al. (2012). Introduction to finite elements in engineering. Pearson Education.

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

S. Rao, Mechanical Vibrations, Addison-Wesley, 1995.

B.Balanchandran,E.Magrab, Vibrations,Thomson,2004.

S.G. Kelly, Mechanical Vibrations: Theory and Applications, SI Edition, Cengage learning, 2011.

S.G. Kelly, Schaum’s Outline of Mechanical Vibrations , McGrawHill, 1996.