UNIVERSIDAD DE CASTILLA - LA MANCHA
GUÍA DOCENTE

1. General information

Course: MECHANICS OF DEFORMABLE SOLIDS
Type: CORE COURSE
Degree: 351 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING (ALM)
Center: 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING
Year: 2
Main language: Spanish
Use of additional languages:
Web site:

Code: 56315
ECTS credits: 6
Academic year: 2023-24
Group(s): 56
Duration: First semester
Second language: English
English Friendly: Y
Bilingual: N

Lecturer: XIAOXIN ZHANG --- - Group(s): 56

Building/Office	Department	Phone number	Email	Office hours
Politécnico/2-A54	MECÁNICA ADA. E ING. PROYECTOS	926052870	Xiaoxin.Zhang@uclm.es	Published in the beginning of the semester.

2. Pre-Requisites

The student must have acquired the knowledge imparted in the subjects of mathematics, physics and graphic expression. In addition, basic knowledge of strength of materials is recommended.

3. Justification in the curriculum, relation to other subjects and to the profession

This subject provides the student with the basic skills necessary to carry out the professional activity of Industrial Technical Engineer, in particular those related to the fundamental concepts of structural calculation, delving into the study of the behavior of deformable solids. This knowledge will later be used as support for the acquisition of skills developed in other specific compulsory subjects such as: Design and Calculation of Metallic and Concrete Structures; Theory of Structures and Industrial Constructions; Design, Calculation and Testing of Machines; o Projects in Engineering.

4. Degree competences achieved in this course

Course competences

Code	Description
A01	To understand and have knowledge in an area of study that moves on from the general education attained at secondary level and usually found at a level that, while supported in advanced text books, also includes some aspects that include knowledge found at the cutting edge of the field of study.
A02	To know how to apply knowledge to work or vocation in a professional manner and possess the competences that are usually demonstrated by the formulation and defence of arguments and the resolution of problems in the field of study.
A04	To be able to transmit information, ideas, problems and solutions to a specialized audience.
A07	Knowledge of Information Technology and Communication (ITC).
A08	Appropriate level of oral and written communication.
A09	Ethical and professional commitment.
C08	Knowledge and use of the principles of the resistance of materials.
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
D04	Knowledge and ability to apply the fundamentals of elasticity and resistance of materials to the behaviour of real solids.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Manual techniques for calculating displacement and strengths in structural elements
Measure simple structural elements
To know when a solid can be studied through geometrical and material simplifications
Apply basic knowledge of elasticity and resistance of materials to real solids
Initiation in learning of the non-elastic behaviour of solids
Calculate the distribution of tensions in a section

6. Units / Contents

Unit 1: Introduction of tensor

Unit 2: Stress tensor

Unit 3: Strain tensor

Unit 4: Relation between the stress and strain

Unit 5: Approach to the elastic problem

Unit 6: Introduction of the plastic theory

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	A01 A02 A04 A07 A08 A09 C08 CB01 CB02 CB03 CB04 CB05 D04	1.36	34	N	-	The teacher will focus on the topic and the fundamental contents of the subject, using a blackboard, audiovisual media and academic experiences.
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	A01 A02 A04 A07 A08 A09 C08 CB01 CB02 CB03 CB04 CB05 D04	0.28	7	N	-	The teacher will carry out exercises and problems related to the corresponding topic.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	A01 A02 A04 A07 A08 A09 C08 CB01 CB02 CB03 CB04 CB05 D04	0.6	15	Y	N	Resolution of individual or small group laboratory practices with computers.
Formative Assessment [ON-SITE]	Assessment tests	A01 A02 A04 A07 A08 A09 C08 CB01 CB02 CB03 CB04 CB05 D04	0.16	4	Y	Y	They will consist of two tests related to aspects of the theoretical-practical application.
Study and Exam Preparation [OFF-SITE]	Self-study	A01 A02 A04 A07 A08 A09 C08 CB01 CB02 CB03 CB04 CB05 D04	3.6	90	N	-	Study and preparation of exams by the student autonomously.
		Total:	**6**	**150**			
	Total credits of in-class work: 2.4				**Total class time hours: 60**		
	Total credits of out of class work: 3.6				**Total hours of out of class work: 90**		

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of problem solving and/or case studies	15.00%	15.00%	The reports of seminars, problems and / or papers presented as well as the attitude shown by the student will be evaluated. The content is on the principal stresses and directions.
Mid-term tests	70.00%	0.00%	Two tests related with the application of theoretical-practical aspects. Each test must be passed at least 4 out of 10.
Final test	0.00%	70.00%	It will consist of a test that encompasses all the topics of the subject (final exam).
Laboratory sessions	15.00%	15.00%	Use software (Mathematica or Matlab, etc.) to check the analytical results of the problems. The results obtained and the cleaning and presentation of the document will be taken into account.
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

The subject will be passed with a score equal to or greater than 5.

Those students who have not passed any of the partial exams, will maintain the score of the exams passed for the final ordinary and extraordinary exams, having to be examined only for the partial tests not passed.

Non-continuous evaluation:

FINAL SCORE = 0.15 x (GRADE IN ASSESSMENT OF PROBLEM SOLVING AND/OR CASE STUDIES) +0.15 x (GRADE IN LABORATORY SESSIONS) + 0.7 x (GRADE IN FINAL TEST).

The subject will be passed with a score equal to or greater than 5.

Specifications for the resit/retake exam:

The subject will be passed with a score equal to or greater than 5.

Specifications for the second resit / retake exam:

The subject will be passed with a score equal to or greater than 5.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	34
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	7

Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Formative Assessment [PRESENCIAL][Assessment tests]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	90

Global activity

Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	34
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	7
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Formative Assessment [PRESENCIAL][Assessment tests]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
	Total horas: 150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Ansel C. Ugural, Saul K. Fenster	Advanced mechanics of materials and applied elasticity (6th edition)	Pearson		978-0134859286	2019	
López Cela, Juan José	Mecánica de los medios continuos	Ediciones de la Universidad de Castilla-La Manc		84-8427-030-0	1999	
Oliver, J. (Javier Oliver Olivella)	Mecánica de medios continuos para ingenieros	Edicions UPC		84-8301-582-X	2002	
Ortiz Berrocal, Luis	Elasticidad	McGraw-Hill		84-481-2046-9	2004	
Spencer, A.J.M.	Continuun mechanics	Dover		0-486-43594-6	1980	