UNIVERSIDAD DE CASTILLA - LA MANCHA
GUÍA DOCENTE

1. General information

Course: STRENGTH OF MATERIALS AND THEORY ON STRUCTURES
Type: CORE COURSE
Degree: 384 - MINING AND ENERGY ENGINEERING DEGREE
Center: 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING
Year: 2
Main language: Spanish
Use of additional languages:
Web site:

Code: 19552
ECTS credits: 6
Academic year: 2023-24
Group(s): 51
Duration: First semester
Second language: English
English Friendly: Y
Bilingual: N

Lecturer: **XIAOXIN ZHANG ---** - Group(s): **51**

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

To have a general knowledge on mathematics, mechanics and graphic expression.

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

Mining engineering subject in which students are initiated in the study of elastic solids and structures. The knowledge in resistance of materials is provided so that the student acquires the foundations and applications in the analysis of stresses and starins of structural components subjected to fixed loads over time. Finally, the subject is complemented with the fundamentals of the analysis of structures that will be useful in later subjects.

4. Degree competences achieved in this course

Course competences

Code	Description
C05	To know about resistance of materials and structures theory
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.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CT00	To promote respect and promotion of Human Rights as well as global access principles and design for everybody according to the 10th final order of the Law 51/2003 of December 2nd¿ about equal opportunities, non-discrimination and universal accessibility for people with disabilities.
CT02	To be acquainted with Information and Communication Technology ICT
CT03	Capacity for written and oral communication skills.
CT04	Capacity to accept ethical and deontological professional responsibility.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

The aim of this subject is the study of deformable solid.We will study monodimensional solids (beams and bars) built of a material which behaves inside an elastic rank. we will learn when a real solid may be studied by means of 2 simplifications: geometrical and material. we will learn manual techniques to calculate effort and displacement in structural elements. we will learn to calculate the tension distribuiton in a section.

6. Units / Contents

Unit 1: Introduction to the resistance of materials: The elastic solid, external loads, static equilibrium, supports, reactions, internal stresses, tensions and deformations.
Unit 2: Traction and compression: actions, tensions, deformations and hyperstatic systems.
Unit 3: Shear: Elementary theory of shear, stress, strain, deformation and mechanical components of shear.
Unit 4: Bending: Types of beams subject to bending, types of bending, stresses, strains, deformations and hyperstatic systems.
Unit 5: Buckling: Instability, Euler's formula, slenderness, coefficient w and buckling in composed bending.
Unit 6: Torsion: Simple torsion, actions, stresses, deformations, hyperstatic systems and combined efforts.
Unit 7: Analysis of simple structures: Typology of structures, resolution methods and structural analysis programs.

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	C05 CB01 CT00 CT04	0.8	20	N	-	The teacher will focus on the topic and the fundamental contents of the subject, using a blackboard, audiovisual media and academic experiences.
Study and Exam Preparation [OFF-SITE]	Self-study	C05 CB02 CT00 CT02	3.6	90	N	-	Study and preparation of exams by the student autonomously.
Individual tutoring sessions [ON-SITE]	Other Methodologies	C05 CB01 CB02 CT00 CT04	0.16	4	N	-	Individual and group tutoring space for the subject work.
Progress test [ON-SITE]	Assessment tests	C05 CB01 CB02 CT00 CT03	0.12	3	Y	N	They will consist of two tests related to aspects of the theoretical-practical application. Those students who do not pass the tests are allowed to go to the ordinary exam (final test).
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	C05 CB01 CT00 CT02 CT03	0.4	10	Y	Y	Resolution of individual or small group laboratory practices.
Class Attendance (practical) [ON-SITE]	Workshops and Seminars	C05 CB01 CT00 CT04	0.4	10	N	-	The teacher will carry out exercises and practical problems related to the corresponding topic.
Workshops or seminars [ON-SITE]	Project/Problem Based Learning (PBL)	C05 CB01 CT00 CT02 CT03	0.48	12	Y	N	Solving problems and / or works proposed by the teacher.
Project or Topic Presentations [ON-SITE]	Workshops and Seminars	C05 CB01 CB02 CB04 CT00 CT02 CT03 CT04	0.04	1	Y	N	Oral presentation of the course work.
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**
Laboratory sessions	15.00%	15.00%	Use software (MDSolids) to check the analytical results of the problems. The results obtained and the cleaning and presentation of the document will be taken into account. The content is on flexure.
Theoretical papers assessment	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.
Progress 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).
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:

CONSIDERATIONS IN CASE OF COPYING: Those students who submit the work of practices and problems (that is, whose percentage of similarity with other student / s, of their course or previous ones, is greater than 80%), will be evaluated with a zero in this activity.

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

For those students who followed the evaluation process described above, the grades obtained are maintained.

Non-continuous evaluation:

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.

For those students who followed the evaluation process described above, the grades obtained are maintained.

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]	20
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Individual tutoring sessions [PRESENCIAL][Other Methodologies]	4
Progress test [PRESENCIAL][Assessment tests]	3
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	10
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	10
Workshops or seminars [PRESENCIAL][Project/Problem Based Learning (PBL)]	12
Project or Topic Presentations [PRESENCIAL][Workshops and Seminars]	1

Global activity

Activities	hours
Individual tutoring sessions [PRESENCIAL][Other Methodologies]	4
Progress test [PRESENCIAL][Assessment tests]	3
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	10
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	10
Workshops or seminars [PRESENCIAL][Project/Problem Based Learning (PBL)]	12
Project or Topic Presentations [PRESENCIAL][Workshops and Seminars]	1
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Russell Charles Hibbeler	Mechanics of materials	Pearson		9780134319650	2015	
Bedford, A.	Mechanics of materials	Prentice Hall		0-201-89552-8	2000	
Beer, Ferdinand P.	Mecánica de materiales	McGraw-Hill Interamericana		970-10-6101-2	2007	
Beer, Ferdinand P.	Mecánica vectorial para ingenieros : Estática	McGraw-Hill Interamericana		978-607-15-0277-3	2010	
Meriam, James L.	Estática	Reverté		84-291-4257-6	1999	
Ortiz Berrocal, Luis	Resistencia de materiales	McGraw-Hill		978-84-481-5633-6	2007	
Rodríguez-Avial Azcunaga, Fernando	Resistencia de materiales	Librería Bellisco		84-85198-58-1 (T. II	1990	
Vázquez Fernández, Manuel	Resistencia de materiales	Noela		84-88012-05-5	1999	