UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: STRENGTH OF MATERIALS
Code: 38316
Type: BASIC
ECTS credits: 9
Degree: 345 - UNDERGRADUATE DEGREE PROGRAMME IN CIVIL ENGINEERING
Academic year: 2022-23
Center: 603 - E.T.S. CIVIL ENGINEERS OF CR
Group(s): 20
Year: 2
Duration: C2
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **ELISA POVEDA BAUTISTA** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Politécnico/2-D56	MECÁNICA ADA. E ING. PROYECTOS	6322	elisa.poveda@uclm.es	To be specified upon class initiation

Lecturer: **CHENGXIANG YU ---** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
A55	MECÁNICA ADA. E ING. PROYECTOS	6313	chengxiang.yu@uclm.es	To be specified upon class initiation

2. Pre-Requisites

Rigid body Mechanics; Science and Technology of Materials in Civil Engineering

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

Provide the basic knowledge for structural design and calculations, in particular, structures of trusses, beams and porticoes.

4. Degree competences achieved in this course

Course competences

Code	Description
CE06	Students have a basic knowledge of the use and programming of computers, operating systems, databases and software with engineering application.
CE07	Students reach understanding and mastery of the basic concepts on the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application for the solution of engineering problems.
CE12	Students have the ability to apply their knowledge of building materials to structural systems. Knowledge of the relationship between the internal structure of materials and the mechanical properties derived from it
CE13	Students gain the ability to analyze and understand how the characteristics of structures influence their behavior. Ability to apply knowledge of the structural behaviour to design structures according to existing standards and using analytical and numerical calculation methods
CG02	Students can use proper oral and written communication

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Students understand the laws of statics and the the way isostatic structures work.

Students use computer programs that simulate the mechanical behavior of materials and structures.

Students understand the behavior of bodies and materials through theoretical models (material point, rigid solid body, deformable solid body). They apply these models to specific cases and use them to predict mechanical phenomena.

Students know the materials of interest in civil engineering. In particular, the interrelationship between the internal structure of the material, their macroscopic properties and the structural forms derived from them. They also know the applications, ways of processing and placing on site of the main materials of interest in civil engineering. They select and design suitable materials for each application and structural form in civil engineering.

6. Units / Contents

Unit 1: Loads in structural elements
Unit 2: Determined structures
Unit 3: Undetermined truss structures
Unit 4: Energetic theorems
Unit 5: Undetermined continuous beams
Unit 6: Lines of influence
Unit 7: Porches

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	CE07 CE12 CE13 CG02	1.8	45	N	-	
Computer room practice [ON-SITE]	Project/Problem Based Learning (PBL)	CE06 CE07 CE12 CE13 CG02	1.4	35	Y	N	Evaluation according to class participation and the results of the proposed problems to be solved in class. Recoverable.
Study and Exam Preparation [OFF-SITE]	Combination of methods	CE07 CE12 CE13	4.4	110	N	-	The students will be given available tools and a collection of resolved problems for after-class studies and exam preparation.
Writing of reports or projects [OFF-SITE]	Cooperative / Collaborative Learning	CE06 CE07 CE12 CE13 CG02	1	25	Y	Y	Teamwork in small groups (from three to five members) and report redaction. Recoverable.
Progress test [ON-SITE]	Assessment tests	CE07 CE12 CE13 CG02	0.2	5	Y	N	Recoverable in the final exam
Laboratory practice or sessions [ON-SITE]	Project/Problem Based Learning (PBL)	CE06 CE07 CE12 CE13 CG02	0.2	5	Y	Y	Laboratory tests are mandatory. Can be re-evaluated with a written report.
		Total:	**9**	**225**			
		Total credits of in-class work: 3.6					**Total class time hours: 90**
		Total credits of out of class work: 5.4					**Total hours of out of class work: 135**

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
Final test	50.00%	70.00%	The final exam will be divided into two (P1, P2), each part with a minimum of 4. Recoverable through a new exam (PF) for non-continuous evaluation with a minimum of 4.
Practicum and practical activities reports assessment	16.80%	30.00%	The practical parts (PL) consists of the laboratory practice and the part from the numerical assignments with a minimum note of 4. The details for the written report will be given in virtual campus when the classes start.
Assessment of problem solving and/or case studies	16.60%	0.00%	The evaluation is based on the excises and problems solved out of class hours (PE).
Progress Tests	16.60%	0.00%	Continuous evaluation of all the materials explained in class (PP).
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 laboratory tests are mandatory and can be recovered with a written report. Requirements for the written report will be indicated on the virtual campus at the beginning of the semester.

In the final exam, topics can be freed if satisfactory results were obtained in the partial exams. In the retake exam, one single exam will be given for the theoretical part, another one for the computer practice.

In order to pass the subject, the students need to have
1) P1, P2, PL >= 4.
3) The final note calculated as 0.5*(P1+P2)+0.168*PL+0.166*PE+0.166*PP >= 5.0

No evaluation will be preserved for the next academic year.

Non-continuous evaluation:

Unless stated otherwise, continuous evaluation criteria will be applied to all students. Anyone choosing non-continuous assessment must inform the lecturer within the class period of the subject. This option is only available if the student's participation in evaluation activities (from the continuous assessment) has not reached 50% of the total evaluation for the subject. For the retake exam, the assessment type used for the final exam will remain valid.

Global evaluation: 0.7*PF+0.3*PL

Specifications for the resit/retake exam:

The retake exam consists of one single test with covers all the theoretical part of the course material (70%) in addition to the written report from the practice (30%). It is going to be evaluated from 0 to 10, with a minimum of 5 to pass.

Specifications for the second resit / retake exam:

The partial tests will be carried to the retake exam, if a minimum of 4 out of 10 is obtained. No evaluations will be preserved for the next academic year.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Unit 1 (de 7): Loads in structural elements	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	5
Teaching period: 15 weeks	
Group 20:	
Initial date: 09-01-2023	**End date:** 21-01-2023
Unit 2 (de 7): Determined structures	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	4
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	1
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	10
Group 20:	
Initial date: 23-01-2023	**End date:** 04-02-2023
Unit 3 (de 7): Undetermined truss structures	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	8
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	1
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	5
Group 20:	
Initial date: 07-02-2022	**End date:** 25-02-2022
Unit 4 (de 7): Energetic theorems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2.5
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	2
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	2
Progress test [PRESENCIAL][Assessment tests]	2.5
Group 20:	
Initial date: 28-02-2022	**End date:** 04-03-2022
Unit 5 (de 7): Undetermined continuous beams	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	11
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	8
Group 20:	
Initial date: 07-03-2022	**End date:** 25-03-2022
Unit 6 (de 7): Lines of influence	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	7
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	3
Group 20:	
Initial date: 28-03-2022	**End date:** 08-04-2022
Unit 7 (de 7): Porches	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	.5
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	4
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	3
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	2
Progress test [PRESENCIAL][Assessment tests]	2.5
Group 20:	
Initial date: 22-04-2022	**End date:** 29-04-2022
Global activity	
Activities	**hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	45
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	40
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	10
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	25
Progress test [PRESENCIAL][Assessment tests]	5
Total horas:	125

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
A. Morales Bueso, J.E. Ruiz García et al	Apuntes de Resistencia de Materiales	Servicio de Publicaciones de Alumnos	Madrid		1966	

F. P. Beer and E.R. Johnston	Mecánica vectorial para ingenieros	MaGraw-Hill		84-481-1079-X	1997
Meriam, James L.	Estática	Reverté		84-291-4257-6	1999
R.C. Yu, J.C. Lancha y E. Poveda	Resistencia de Materiales: Apuntes y Problemas Resueltos	CIMNE	Barcelona	978-84-943928-9-4	2015
S.T. Timoshenko	Strength of materials, Part I: Element theory and Problems	Lancaster Press, USA	New York		1948
S.T. Timoshenko	History of strength of materials	Maple Press Company, USA	York		1953