



1. General information

Course: METALLIC AND CONCRETE STRUCTURES

Type: ELECTIVE

Degree: 351 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING (ALM)

Center: 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING

Year: 4

Main language: Spanish

Use of additional languages:

Web site:

Code: 56351

ECTS credits: 6

Academic year: 2023-24

Group(s): 56

Duration: First semester

Second language:

English Friendly: Y

Bilingual: N

Lecturer: JOSE TEJERO MANZANARES - Group(s): 56

Building/Office	Department	Phone number	Email	Office hours
ElHuyar/2.05	MECÁNICA ADA. E ING. PROYECTOS	926052320	jose.tejero@uclm.es	The tutorial schedule will be published at the beginning of each semester on the bulletin board of the center.

2. Pre-Requisites

In order to take this subject to the maximum advantage, it is recommended that the student has achieved skills related to resolution of mechanical engineering problems, knowledge and use of the principles of strength of materials, elastic behavior of threedimensional.

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

The objective of this subject is the design and calculation of concrete structures. You will learn how these structures work and how they are dimensioned in accordance with current legal regulations. There is a clear interest in coordinating with subjects from previous

4. Degree competences achieved in this course

Course competences

Code	Description
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.
A03	To have the capability to gather and interpret relevant data (normally within the area of study) to make judgements that include a reflection on themes of a social, scientific or ethical nature.
A04	To be able to transmit information, ideas, problems and solutions to a specialized audience.
A05	To have developed the learning skills necessary to undertake subsequent studies with a greater degree of autonomy.
A07	Knowledge of Information Technology and Communication (ITC).
A08	Appropriate level of oral and written communication.
A16	Ability to analyse and evaluate the social and environmental impact of technical solutions.
A17	Ability to apply principles and methods of quality control.
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
G02	Knowledge and ability in the calculation and design of structures using reinforced concrete.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Advanced knowledge of the design and calculation of structures made from reinforced concrete

6. Units / Contents

Unit 1: FUNDAMENTALS, CALCULATION AND DIMENSIONING OF REINFORCED CONCRETE PILLARS AND BEAMS

Unit 2: FUNDAMENTALS, CALCULATION AND DIMENSIONING OF FLOORS AND SLABS

Unit 3: FUNDAMENTO, CÁLCULO Y DIMENSIONAMIENTO DE MUROS DE HORMIGÓN ARMADO

ADDITIONAL COMMENTS, REMARKS

Practical:

(P.1). Strap design.

(P.2). Pillar design. Technical-economic comparison.

(P.3). Beam design. Technical-economic comparison.

(P.4). Twisted piece design.

(P.5). Unidirectional slab design.

(P.6). Design of reinforced concrete structures.

7. Activities, Units/Modules and Methodology

4. 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	A02 A03 A04 A05 A07 A08 A16 A17 CB01 CB02 CB03 CB04 CB05 G02	1	25	N		Expository method / lecture, Resolution of exercises and problems
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	A02 A03 A04 A05 A07 A08 A16 A17 CB01 CB02 CB03 CB04 CB05 G02	0.6	15	N		Resolution of practical cases.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	A02 A03 A04 A05 A07 A08 A16 A17 CB01 CB02 CB03 CB04 CB05 G02	0.6	15	Y	Y	They will consist of the design of structural elements of industrial buildings in the lab using software specialized. The students individually prepare a memory of the practices carried out at the laboratory.
Writing of reports or projects [OFF-SITE]	Self-study	A02 A03 A04 A05 A07 A08 A16 A17 CB01 CB02 CB03 CB04 CB05 G02	3.6	90	N		Project-based learning. Autonomous personal study of the student and project work supervised.
Formative Assessment [ON-SITE]	Assessment tests	A02 A03 A04 A05 A07 A08 A16 A17 CB01 CB02 CB03 CB04 CB05 G02	0.2	5	Y	Y	Presentation and defense of works.
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
Final test	70.00%	70.00%	Global individual work consisting of the resolution of type problems, project work related to the laboratory practices and in the design of a construction industrial with different typologies
Laboratory sessions	15.00%	15.00%	Elaboration of memory of individual practices. It will be valued work done by the student both during the performance of practices such as memory quality presented according to the script that will be provided for each practice. As it is a mandatory activity, it is a condition. It is necessary to attend the laboratory practices to be able to pass the subject. Otherwise, the rating will appear in the minutes will be FAILURE (4). Recoverable activity, that is, in the case of not attending the internships, the student may take an examination of practices. Once the practices have been approved, they will be considered as approved during two academic years. If after that time the student had not passed the subject, he must practice again.
Projects	15.00%	15.00%	Elaboration of group theme and its presentation and defense.
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 course is designed to follow in person the lectures, the presentations of the projects, the practical sessions in the computer room, problem work sessions, etc. Attendance at 80% of the training activities is recommended.
To pass each evaluation system, you must obtain 5 points out of 10, although it is possible to compensate between the qualifications of the different systems as long as you have a minimum score of 4 points out of 10 in the part not passed.
In the event that there are special circumstances that may affect assistance, such as long-term illnesses, circumstances exceptional work or personal, etc., it is recommended to let the teaching staff know, as soon as possible, to study a personalized work plan of the subject.

Non-continuous evaluation:

The course is designed to follow in person the lectures, the presentations of the projects, the practical sessions in the computer room, problem work sessions, etc. Attendance at 80% of the training activities is recommended.
To pass each evaluation system, you must obtain 5 points out of 10, although it is possible to compensate between the qualifications of the different systems as long as you have a minimum score of 4 points out of 10 in the part not passed.
In the event that there are special circumstances that may affect assistance, such as long-term illnesses, circumstances exceptional work or personal, etc., it is recommended to let the teaching staff know, as soon as possible, to study a personalized work plan of the subject.

Specifications for the resit/retake exam:

In the extraordinary call, the same criteria indicated for the ordinary call will be followed.

Specifications for the second resit / retake exam:

In the extraordinary call, the same criteria indicated for the ordinary call will be followed.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	25
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	15
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Writing of reports or projects [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	5
Global activity	
Activities	hours
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Class Attendance (theory) [PRESENCIAL][Lectures]	25
Writing of reports or projects [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	15
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Calavera Ruiz, J. M.	PROYECTO Y CÁLCULO DE ESTRUCTURAS DE HORMIGÓN	INTEMAC	Madrid	9788488764058	2008	
Argüelles Álvarez, R.	Cálculo de Estructuras, Tomo II	Escuela Superior de Ingenieros de Montes	Madrid	84-600-2412-1	2015	
Calavera Ruiz, J. M.	Cálculo de Estructuras de Cimentación	INTEMAC	Madrid	84-88764-09-X	2000	
Juan Tomás Celigüeta	Curso de Análisis Estructural	EUNSA	Pamplona	84-313-1612-8	1998	
Argüelles Álvarez, R.	Cálculo de Estructuras, Tomo I	Escuela Superior de Ingenieros de Montes	Madrid	84-600-2411-3	2015	
Argüelles Álvarez, R.	La Estructura Metálica Hoy	Bellisco	Madrid	84-600-5672-4	2010	
Monfort Leonart , José	Estructuras Metálicas para Edificación	Universidad Politécnica de Valencia	Valencia	84-8363-021-4	2006	
Montoya, Messeguer y Morán	Hormigón Armado	Gustavo Gili	Barcelona	978-84-252-2307-5	2009	
Argüelles Álvarez, R.	Análisis de Estructuras	Fundación del Conde del Valle de Salazar	Madrid	84-86793-37-8	1996	
Argüelles Álvarez, R.	Cálculo de Estructuras, Tomo III	Escuela Superior de Ingenieros de Montes		84-600-4189-1	2015	
Calavera Ruiz, J. M.	CÁLCULO DE FLECHAS EN ESTRUCTURAS DE HORMIGÓN ARMADO	INTEMAC	Madrid	978-84-87892-21-9	2009	
Calavera Ruiz, J. M.	MUROS DE CONTENCIÓN Y MUROS DE SÓTANO	INTEMAC	Madrid	84-398-9092-3	2001	
Ministerio de Transportes, Movilidad y Agenda Urbana	Código Estructural	Ministerio de Transportes, Movilidad y Agenda Urbana	Madrid		2021	