

**1. General information****Course:** AGRO-INDUSTRIAL CONSTRUCTION I**Code:** 60423**Type:** ELECTIVE**ECTS credits:** 6**Degree:** 411 - UNDERGRADUATE DEGREE PROGRAMME IN AGRICULTURAL AND FOOD ENGINEERING**Academic year:** 2023-24**Center:** 107 - E.T.S. OF AGRICULTURAL ENGINEERS OF C. REAL**Group(s):** 20**Year:** 3**Duration:** C2**Main language:** Spanish**Second language:****Use of additional languages:****English Friendly:** Y**Web site:****Bilingual:** N**Lecturer:** JESUS ANTONIO LOPEZ PERALES - Group(s): 20

Building/Office	Department	Phone number	Email	Office hours
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2. Pre-Requisites

No prerequisites are required, but in order to achieve the learning outcomes it is recommended to have passed the first and second year subjects, in particular:

- First year: Algebra, Calculus and Differential Equations, Physics I, Physics II and Graphic Expression.
- Second year: Calculus of Structures and Electrification. The first subject is fundamental for a correct follow up of the contents of Agro-industrial Constructions I, as it establishes the principles of resistance of materials and calculation of structures, essential to be able to carry out metallic structure and reinforced concrete constructions.

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

The professional competences of the Agricultural Engineer (Order CIN/323/2009 of 9 February) include the ability to draw up and sign projects and the management of works aimed at the construction or reform of agrifood industries.

This subject is of great interest within the Degree in Agricultural and Agri-Food Engineering (mention in Agricultural and Food Industries), as it teaches the student the design and dimensioning procedures of agro-industrial constructions conceived with metallic structures.

The subject is closely related to the subjects of Structural Calculation and Electrification, with Agro-industrial Constructions II and with the subject of Installations in Agro-food Industries.

On a second level, the subject is also closely related to other subjects such as Industrial Design or Projects

4. Degree competences achieved in this course**Course competences**

Code	Description
E54	Ability to know, understand and use the principles of engineering in the agri-food industries
E57	Ability to know, understand and use the engineering principles of works and facilities
E58	Ability to know, understand and use the principles of agro-industrial constructions
G02	Computer knowledge
G03	Speaking and writing skills
G04	Analysis and synthesis capacity
G06	Ability to manage information
G07	Problem resolution
G08	Decision-making
G13	Teamwork
G14	Autonomous Learning
G16	Creativity
G19	Quality Motivation
G21	Ability to apply practical knowledge
G24	Capacity for the prior preparation, conception, drafting and signing of projects whose purpose is the construction, reform, repair, conservation, demolition, manufacture, installation, assembly or exploitation of movable or immovable property that by its nature and characteristics are included in the technique of agricultural and livestock production (facilities or buildings, farms, infrastructures and rural roads), the agri-food industry (extractive, fermentative, dairy, canning, fruit and vegetable, meat, fishing, salting industries and, in general, any other dedicated to the preparation and/or transformation, conservation, handling and distribution of food products) and gardening and landscaping (urban and/or rural green spaces, parks, gardens, nurseries, urban trees, etc., public or private sports facilities and environments for landscape recovery)
G25	Adequate knowledge of physical problems, technologies, machinery and water and energy supply systems, the limits imposed by budgetary factors and construction regulations, and the relationships between facilities or buildings and farms, agri-food industries and spaces related to the gardening and landscaping with their social and environmental environment, as well as the need to relate them with human needs and the preservation of the environment.
	Ability to direct the execution of projects related to agri-food industries, agricultural farms and green spaces and their buildings,

G26	infrastructures and facilities, the prevention of risks associated with this execution and the supervision of multidisciplinary teams and human resources management, in accordance with deontological criteria.
G29	Ability to direct and manage all kinds of agri-food industries, agricultural and livestock farms, urban and/or rural green spaces, and public or private sports areas, with knowledge of new technologies, quality processes, traceability and certification and the marketing and commercialization techniques of food products and cultivated plants
G31	Ability to solve problems with creativity, initiative, methodology and critical thinking
G33	Ability to search for and use the rules and regulations relating to their field of action

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Knowledge of the procedures for determining and calculating the actions to be applied on a building.

Knowledge of the different construction elements that make up a building.

Knowledge of the methods and procedures for calculating and dimensioning the elements of a steel structure, verifying the safety against ultimate limit states (instability and resistance) and against service limit states (deformation).

Development of the ability to design and project steel structures.

Development of the ability to design, calculate and dimension connections in steel structures, both bolted and welded.

6. Units / Contents

Unit 1: Buildings

Unit 1.1 Design and Codes in agroindustrial construction

Unit 1.2 Constructive members

Unit 1.3 Actions on building

Unit 2: Steel structures

Unit 2.1 Calculation bases. Design

Unit 2.2 Ultimate Limit States (ULS)

Unit 2.3 Serviceability Limit States (SLS)

Unit 3: Steel connections

Unit 3.1 Tipology of connections

Unit 3.2 Bolted connections

Unit 3.3 Welded connections

Unit 3.4 Bases of columns

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Writing of reports or projects [OFF-SITE]	Case Studies	E54 E57 E58 G02 G03 G04 G06 G07 G08 G13 G14 G16 G19 G21 G24 G25 G26 G29 G31 G33	2	50	Y	N	Students will be asked to carry out a series of tasks to reinforce their knowledge of the calculation of steel structure construction elements. This activity is not recoverable. If the student decides not to hand in the assignments, he/she will be able to pass the course if he/she passes the evaluation tests, as the practical part, which is the most valued part, is based on these practical cases.
Class Attendance (theory) [ON-SITE]	Lectures	E57 E58 G02 G03 G04 G06 G07 G08 G13 G16 G19 G21 G24 G25 G26 G29 G31 G33	0.6	15	Y	N	All theoretical content will be covered in class, with those that are more difficult for the student or of greater relevance to the subject being taught in depth.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	E54 E57 E58 G02 G03 G04 G06 G07 G08 G13 G16 G19 G21 G24 G25 G26 G29 G31 G33	1	25	Y	N	Carrying out practical work to calculate different structural steel elements and their joints.
Study and Exam Preparation [OFF-SITE]	Self-study	E54 E57 E58 G02 G03 G04 G06 G07 G08 G13 G14 G16 G19 G21 G24 G25 G26 G29 G31 G33	1.6	40	N	-	Student study of the theory and problem of the subject.
Mid-term test [ON-SITE]	Assessment tests	E54 E57 E58 G02 G03 G04 G06 G07 G08 G13 G16 G19 G21 G24 G25 G26 G29 G31 G33	0.3	7.5	Y	Y	Two written mid-term exams with theory and problems, eliminatory from 4 (out of 10). If this grade is not obtained, it will be made up in the official exams. These mid-term exams are held throughout the term.
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	E54 E57 E58 G02 G03 G04 G06 G07 G08 G13 G14 G16 G19 G21 G24 G25 G26 G29 G31 G33	0.5	12.5	Y	N	Practical work on the calculation of structural steel construction elements and their connections.
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				

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
Projects	20.00%	0.00%	Exercises on the calculation of structural steel elements and their connections. Delivery will be made at the end of the four-month period, although it is possible to make partial deliveries before the indicated date.
Mid-term tests	70.00%	0.00%	In order to be able to add the percentages of the rest of the assessment systems, it is necessary to obtain a minimum mark of 4/10 in the assessment tests. In the official exams, the student will be examined in the part(s) in which he/she has not achieved the grade of 4/10.
Assessment of active participation	10.00%	0.00%	The active participation of the student in the theoretical and practical classes will be valued.
Final test	0.00%	100.00%	In this test, the theoretical and practical knowledge developed during the course will be evaluated in the official exams.
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:

In order to pass the course, a minimum mark of 4/10 will be required in each of the parts of the course obtained in the assessment tests, and the final mark must be equal to or higher than 5.

Non-continuous evaluation:

There will be a final exam in which all the theoretical and practical content taught during the academic year will be covered.
A mark of 5 or more is required to pass the subject.

Specifications for the resit/retake exam:

The same as in the ordinary exam.
In continuous assessment, the marks obtained in the work and in the assessment of class participation in the ordinary exam will be kept, and the part(s) of the subject(s) not passed in the ordinary exam will have to be made up.

Specifications for the second resit / retake exam:

The same as in non-continuous evaluation.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Unit 1 (de 3): Buildings	
Activities	Hours
Writing of reports or projects [AUTÓNOMA][Case Studies]	10
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	8
Mid-term test [PRESENCIAL][Assessment tests]	1.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.5
Unit 2 (de 3): Steel structures	
Activities	Hours
Writing of reports or projects [AUTÓNOMA][Case Studies]	20
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	10
Study and Exam Preparation [AUTÓNOMA][Self-study]	16
Mid-term test [PRESENCIAL][Assessment tests]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	5
Unit 3 (de 3): Steel connections	
Activities	Hours
Writing of reports or projects [AUTÓNOMA][Case Studies]	20
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	10
Study and Exam Preparation [AUTÓNOMA][Self-study]	16
Mid-term test [PRESENCIAL][Assessment tests]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	5
Global activity	
Activities	hours
Mid-term test [PRESENCIAL][Assessment tests]	7.5
Writing of reports or projects [AUTÓNOMA][Case Studies]	50
Class Attendance (theory) [PRESENCIAL][Lectures]	15

Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	12.5
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	25
Study and Exam Preparation [AUTÓNOMA][Self-study]	40
Total horas:	150

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
LÓPEZ PERALES, J.A.; LÓPEZ GARCÍA, L.; MORALES RODRÍGUEZ, P.	Problemas de estructura metálica	UCLM	Cuenca	978-84-9044-149-7	2015	http://publicaciones.uclm.es/2015/06/25/problemas-de-estructuras-metalicas/
MONFORT LLEONART, J.	Estructuras metálicas para edificación	Universidad Politécnica de Valencia	Valencia	9788483630211	2006	
MINISTERIO DE FOMENTO	Instrucción de acero estructural	Ministerio de Fomento	Madrid	978-84-498-0917-0	2012	
MONFORT LLEONART, J; PARDO ROS, J.L; GUARDIOLA VILLORA, A.	Problemas de estructuras metálicas adaptados al Código Técnico	Universidad Politécnica de Valencia	Valencia	9788483633229	2008	
ARGÜELLES ÁLVAREZ, R; ARGÜELLES BUSTILLO, R; ATIENZA REALES, J.R; ARRIAGA MARTITEGUI, F; MARTÍNEZ CALLEJA, J.J	Estructuras de acero. Uniones y sistemas estructurales (2ª edición)	Bellisco	Madrid	9788496486539	2015	
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European Committee for Standardization	EN 1993-1-8. Eurocode 3: Design of steel structures. Part. 1-8. Design of joints		Brussels, Belgium		2005	
The Steel Construction Institute and The British Constructional Steelwork Association	Joints in steel construction: Simple joints to Eurocode 3. Publication P358	SCI/BCSA	Ascot, U.K.		2011	