



DEGREE CURRICULUM

AGRICULTURAL BUILDINGS AND FACILITIES

Coordination: FERNÁNDEZ SERRANO, ÁLVARO

Academic year 2020-21

Subject's general information

Subject name	AGRICULTURAL BUILDINGS AND FACILITIES				
Code	102560				
Semester	1st Q(SEMESTER) CONTINUED EVALUATION				
Typology	Degree	Course	Character	Modality	
	Bachelor's Degree in Agricultural and Food Engineering	3	COMPULSORY	Attendance-based	
Course number of credits (ECTS)	6				
Type of activity, credits, and groups	Activity type	PRACAMP	PRALAB	PRAULA	TEORIA
	Number of credits	0.3	1.2	1.3	3.2
	Number of groups	1	1	1	1
Coordination	FERNÁNDEZ SERRANO, ÁLVARO				
Department	AGRICULTURAL AND FOREST ENGINEERING				
Teaching load distribution between lectures and independent student work	Face-to-face hours: 60 Non-presential hours: 90				
Important information on data processing	Consult this link for more information.				
Language	catalan / spanish				

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
FERNÁNDEZ SERRANO, ÁLVARO	alvaro.fernandezserrano@udl.cat	3	
ROSELL POLO, JOAN RAMON	joanramon.rosell@udl.cat	3	

Subject's extra information

Requisite

Prerequisite: Fonaments de l'Enginyeria Rural i Construcció

Notice

It's strongly recommended to check regularly the information given in 'Campus Virtual'

Learning objectives

Learning objectives and outcomes

The student, on passing the subject, must be able to:

R1: Know the components of concrete and their properties.

R2: Calculate the dosage of a concrete.

R3: Calculate simple elements of reinforced concrete.

R4: Calculate simple steel elements.

R5: Know the typologies and structural materials of the commercial greenhouses.

R6: Know and understand the Regulations, the components and characteristics of a Low Voltage Electrical Installation.

R7: Design and calculate an electrical installation of a fruit and vegetable farm.

R8: Know the operation of electrical machines and calculate their characteristic parameters.

R9: Know and measure the main systems for Rural Electrification: conventional and alternative.

R10: Know and apply techniques for optimizing electricity consumption and the Regulations on Electricity Tariffs.

Competences

General competences

At least the following basic competencies will be guaranteed:

CG1. Ability to prepare, design, draft and sign projects for the construction, refurbishment, repair, conservation, demolition, manufacture, installation, assembly or operation of movable or immovable property which, by its nature and characteristics are included in the technique of agricultural and livestock production (facilities or buildings, farms, infrastructure and rural roads), the agri-food industry (extractive industries, fermentation, dairy, canning, fruit and vegetables, meat, fishing, salting and in general, any other dedicated to the elaboration and / or transformation, conservation, manipulation 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 subject to landscape recovery).

CG2. 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 areas related to gardening and landscaping with their social and environmental environment, as well as the need to relate those and this environment to human needs and the preservation of the environment.

CG8. Ability to solve problems with creativity, initiative, methodology and critical reasoning.

CG10. Ability to research and use the rules and regulations relating to their field of action.

CG12. Ability to work in multidisciplinary and multicultural teams.

CG13. Correction in oral and written expression

Specific competences

Ability to know, understand and use the principles of:

CEHJ2. Engineering of green areas, sports areas and fruit and vegetable farms. Civil works, facilities and infrastructures of green areas and protected areas.

Electrification. Irrigation and drainage. Machinery for horticulture and gardening.

Subject contents

Content

Unit 1: Actions in the building. Stock combinations. CTE. Last Limit States. Service Limit States.

Unit 2: Concrete. Regulations, EHE. Components. Durability. Dosage. Calculation of simple sections of reinforced concrete.

Unit 3: Calculation of steel sections. Metal profiles. Calculation of shafts. Internal efforts. Pure bending, simple bending and compound bending. Normal tension, elastic limit. Interaction with shear stress. Linking.

Unit 4: Low Voltage Electrical Installations (LVEI). Review of alternating currents.

Regulations for LVEI. Elements and characteristics of an LVEI. Security of the LVEI. LVEI design and calculation. The electrical project in Low Voltage. Documentation.

Unit 5: Electrical machines (EM). General principles of EM. Transformers. Rotary direct current EM. Rotary alternating current EM. Special EM. Protection of EMs. Principles of EM automation.

Unit 6: Systems for Rural Electrification. Optimization of electricity consumption. Electricity rates. Power lines. Transformation Centers. Generators. Renewable energies. Photovoltaic installations. Guidelines and techniques for saving and optimizing electricity consumption. Pricing and economic cost of electricity.

Practical activities

Solving case studies with a computer.

Solving exercises and examples in the classroom.

Methodology

Activitats d'aprenentatge

BLOC		Lectures and problems solving (hours)	Practices with the computer (hours)	Evaluation (hours)	Total (hours)	Total (hours)
		Classroom / Homework	Classroom / Homework	Classroom	ClassroomI	Homework
1	Introduction	2			2	
2	Unit 1				12	18
	Lectures and problems solving	6/10				
	Calculation of actions with computer		4/8			
	Exam Unit 1			2		
3	Unit 2				4	6
	Lectures and problems solving	4/6				
4	Unit 3				12	21
	Lectures and problems solving	5/10				
	Sizing of elements with computer		5/11			
	Exam Units 2 i 3			2		
5	Unit 4				14	21
	Lectures and problems solving	12/21				
	Exam Unit 4			2		
6	Unit 5				7	12
	Lectures and problems solving	7/12				
7	Unit 6				9	12
	Lectures and problems solving	7/12				
	Exam Units 5 i 6			2		
TOTAL					60	90

Development plan

Type of Activity	Content	Objectives	Classroom hours	Accumulated hours	Evaluation	
					Unit	Time (h)
Lecture	Introduction	General overview.	2	2		
Lecture and Problems solving	Unit 1. Review of reactions, internal stresses and stresses in beams	R4	1	3		
Lecture and Problems solving	Unit 1. Calculation of actions in the building (CTE)	R2	3	6		
Lecture and Problems solving	Unit 1. Combination of actions	R3	3	9		
Computer practices	Unit 1. Calculation and combinations of actions	R2,R3	4	13		
				15	Unit 1	2
Lecture and Problems solving	Unit 2. Components and dosage of concrete	R1	2	17		
Lecture and Problems solving	Unit 2. Calculation of simple sections of reinforced concrete.	R1	2	19		
Lecture and Problems solving	Unit 3. Calculation of unbound steel sections.	R4	1	20		
Lecture and Problems solving	Unit 3. Compression bonding in steel elements	R4	1	21		
Lecture and Problems solving	Unit 3. Bonding in bending steel elements.	R4	1	22		
Lecture and Problems solving	Unit 3. Bonding in steel elements in combination of bending and compression.	R4	2	24		
Computer practices	Unit 3. Sizing of steel beams	R4	4	28		
				30	Units 2 and 3	2
Lecture	Unit 4. Review of alternating currents	R6, R7	1	31		
Lecture	Unit 4. Regulations for Low voltage electrical installations, LVEI. Elements and characteristics of an LVEI.	R6, R7	4	35		
Lecture and Problems solving	Unit 4. LVEI design and calculation. Section of conductors.	R6, R7	4	39		

Lecture and Problems solving	Unit 4. Security of the LVEI. The electrical project in LV. Documentation.	R6, R7	3	42		
				44	Unit 4	2
Lecture	Unit 5. General principles of Electrical machines.	R8	1	45		
Lecture	Unit 5. Electric power converters Transformers	R8	1	46		
Lecture	Unit 5. DC and AC rotary electrical machines.	R8	3	49		
Laboratory practices	Unit 5. Electrical machines	R8	2	51		
Lecture	Unit 6. Power lines.	R9	1,5	52,5		
Lecture	Unit 6. Transformation Centers. Generators.	R9	1	53,5		
Lecture	Unit 6. Renewable energies.	R9	2,5	56		
Lecture	Unit 6. Electricity efficiency and savings. Electricity rates.	R10	2	58		
				60	Units 5 and 6	2
					final recovery Exam	2

Evaluation

Type of activity	Learning outcome	Procedure	Weight rating (%)
Units 1, 2 i 3	R1, R2, R3, R4	Questionnaires	10
Units 1, 2 i 3	R1, R2, R3, R4	Exam	40
Unit 4	R6, R7	Exam	25
Units 5 i 6	R8, R9, R10	Exam	25
Total			100

Criteria for passing:

- The final grade must be equal to or higher than 5
- The mark of each exam must be equal to or higher than 4

Exàms

- The exams of units 1, 2 and 3 will have a part of short questions (30%) and another of problems (70%). In the problem part, the corresponding CTE regulations can be used.
- In the exams of units 4, 5 and 6 the only documentation that will be able to consult is a form elaborated by the own student.

Pràctices

- Any practice delivered after the deadline will be considered **undelivered**.

General criteria.

- When correcting exams and practices, the absence or incorrectness of the units in the numerical results, conceptual errors, gross errors or contradictions will be penalized very especially. The presence of any of the errors described herein may be sufficient cause for an examination to be qualified as a fail.

Bibliography

Basic bibliography

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