DEGREE CURRICULUM

MACHINERY, BUILDINGS AND LIVESTOCK EQUIPMENT

Coordination: LAMPURLANÉS CASTEL, JORGE

Academic year 2020-21

MACHINERY, BUILDINGS AND LIVESTOCK EQUIPMENT 2020-21

Subject's general information

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<tr><td>Subject name</td><td>MACHINERY, BUILDINGS AND LIVESTOCK EQUIPMENT</td></tr>
<tr><td>Code</td><td>102556</td></tr>
<tr><td>Semester</td><td>1st Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Agricultural and Food Engineering</td><td>4</td><td>COMPULSORY</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
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<tr><th>Activity type</th><th>PRACAMP</th><th>PRALAB</th><th>PRAULA</th><th>TEORIA</th></tr>
<tr><td>Number of credits</td><td>0.2</td><td>0.6</td><td>1.3</td><td>3.9</td></tr>
<tr><td>Number of groups</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>LAMPURLANÉS CASTEL, JORGE</td></tr>
<tr><td>Department</td><td>AGRICULTURAL AND FOREST ENGINEERING</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>Classroom time : 60
Homework time: 90</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
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MACHINERY, BUILDINGS AND LIVESTOCK EQUIPMENT 2020-21

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
LAMPURLANÉS CASTEL, JORGE	jorge.lampurlanes@udl.cat	2	
LLORENS CALVERAS, JORDI	jordi.llorens@udl.cat	2	
ROSELL POLO, JOAN RAMON	joanramon.rosell@udl.cat	2	

Subject's extra information

Subject / subject in the whole curriculum

The subject, compulsory within the specialty of Agricultural Production, deals with the machinery, the constructions and the necessary facilities for the development of the own activities of the specialty.

Corequisites:

Fundamentals of Agricultural Engineering

Construction

Recommendations:

Consult regularly the Virtual Campus

Learning objectives

The student should be able to:

1. Recognize the **functions** of constructive elements in livestock housing and **orders of magnitude**.
2. Perform simple **structural calculation**.
3. Know how to **order** concrete and **design** footings for livestock housing.
4. Know and understand the **Regulations**, the components and characteristics of a **Low Voltage** installation.
5. **Design and calculate** an electrical installation of a livestock farm.
6. Know the operation of **electrical machines**.
7. Know the main **systems** for Rural Electrification: conventional and alternative.
8. Know and apply techniques to optimize energy **consumption** and Regulation about Electricity **Rates**.
9. Know and understand the basic characteristics of the **tractors** and the main **agricultural machinery**, comparing the most important parameters.
10. Have a good knowledge of the scientific method and its importance in the **regulations, experimental demonstrations and tests** of agricultural machines.
11. Know the **risks** involved in the use of agricultural machinery and how to prevent them.

Competences

Specific competences

The syllabus is developed taking into account the specific competencies of: CEEA3.

> **Engineering of farms. Electrification of farms. Agricultural machinery**. Irrigation systems and technology **Agro-farming constructions. Facilities for health and animal welfare**.

Subject contents

SECTION I: CONSTRUCTION

Theme 1: **Beam** as a constructive element. **Enclosures** in agro-industrial warehouse. Roofs and floors. Brick walls, precast plates and concrete walls. **Transmission of loads**

Theme 2: **Structural design**. Demands Actions. Combination of actions. Load hypothesis. Use of CYPE

Theme 3: **Concrete**. Order. Footings

SECTION II: INSTALLATIONS

Theme 4: **Low voltage electrical installations (LVEI)**. Review of alternating currents. Regulations for LVEI. Elements and characteristics of an LVEI. Security of the LVEI. Design and calculation of LVEI. The electric project in LV. Documentation

Theme 5: **Electrical machines (EM)**. General principles of EM. Power converters. EM rotary of continuous current. EM rotary alternating current EM specials Protection of EM. Principles of EM automation

Theme 6: **Systems for rural electrification**. Optimization of electricity consumption. Electric rates. Power lines Transformation centers. Generators Renewable energies. Photovoltaic installations. Guidelines and techniques for saving and optimizing the consumption of electrical energy. Tariff and economic cost of electricity

BLOCK III MACHINERY

Theme 7: **The agricultural tractor**. Use of the tractor in the agricultural exploitation and classification. Review of engine and transmission. Steering, brakes and rolling systems. The tractor-machinery union. Load transfer. Traction mechanics. Rolling resistance. Adherence Slip. Selection and uses of the tractor.

Theme 8: **Machinery for soil work, sowing and planting equipment**. Technical principles of cultivation. Machinery for primary crops. Machinery for secondary cultivation. Planting systems: projection seeders, seeders in rows, mono-planters, direct planting and hydro-production. Combined planting equipment.

Theme 9: **Machinery for the distribution of fertilizers and phytosanitary products**. Mineral fertilizer distributors. Distributors of solid organic fertilizers. Distributors of plant protection products. New technologies for the application of plant protection products.

Practical activities

Resolution of practical cases with a computer.
Way out
Exercise and sample resolution in the classroom.
Tractor practice
Practice regulation and testing of application equipment.

Methodology

The subject is organised in three independent blocks. See Development plan. Classes are basically given in Catalan.

Development plan

Activity	Contents	Scope	Presential hours	Accumulated hours	Evaluation		
BLOCK I					Part	Value	Time (h)
Cases	Theme 1. Structural design scope and Standards. RdM review. Beam identification in agricultural constructions	R2	2	2			
Lecture	Theme 1. Enclosures characteristics and ties with structures. Load transmission	R1	2	4			
					Theme 1 Oral defense	1/9	30 min/stu
Lecture	Theme 2. Structural materials. Requirements. Limit states.	R2	2	6			
Problem resolution	Theme 2. Actions. Load combinations.	R2	2	8			
Computer class	Theme 2. CYPE use and rough calculations	R2	6	14			
					Theme 2 Oral defense	1/9	30 min/stu
Lecture	Theme 3. Reinforced concrete. Description and order	R3	2	16			
Problem resolution	Theme 3. Foundations by footings	R3	4	20			
					Theme 3 Oral defense	1/9	30 min/stu
BLOCK II							
Lecture	Theme 4. Introduction and Alternate current review	R4, R5	2	22			

Lecture	Theme 4. Low Voltage Electrical Installations (LVEI) Standards. Elements and characterístics of LVEI	R4, R5	1	23			
Lecture Problem resolution	Theme 4. Design and calculus of LVEI. Cable section	R4, R5	3,5	26,5			
Lecture. Problem resolution	Theme 4. Security of LVEI. The electrical project in LV. Documentation	R4, R5	3,5	30			
Lecture	Theme 5. General principles of Electrical Machines EM	R6	1	31			
Lecture	Theme 5. Power converters-Transformers-Transformation Centers	R6	1	32			
Lecture	Theme 5. CC and CA rotative electrical machines	R6	3	35			
Lecture	Theme 6. Electrical power lines	R7	1	36			
Lecture	Theme 6. Renewable energies	R7	2,5	38,5			
Lecture	Theme 6. Eficiency and savings in electric energy. Electrical rates	R8	1,5	40			
					Themes 4, 5 & 6 Exam	3/9	2h
BLOCK III							
Lecture	Theme 7. Farm tractor.	R9, R10 & R11	6	46			
Laboratory practices	Theme 7. Farm tractor	R9, R10 & R11	2	48			
Lecture	Theme 8. Soil work, sowing and planting	R9, R10 & R11	5	53			
Lecture	Theme 9. Distribucion of fertilizer and phytosanitarie products	R9, R10 & R11	5	58			
Laboratory practices	Theme 9. Distribucion of fertilizer and phytosanitarie products	R9, R10 & R11	2	60			
					Themes 7,8 & 9	3/9	2h

Evaluation

Chapters	Procedure	Weight
Theme 1, 2 & 3	Questions (20%) and exam (80%)	1/3
Theme 4, 5 & 6	Exam	1/3
Theme 7, 8 & 9	Report of practices and exam	1/3

Observations

- **Compulsory passing every block. However, ONE block could be compensated with a minimum punctuation of 4.**

Bibliography

Basic references

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