28913 - Engines and machines

Información del Plan Docente

Academic Year	2017/18
Faculty / School	201 - Escuela Politécnica Superior
Degree	437 - Degree in Rural and Agri-Food Engineering
ECTS	6.0
Year	2
Semester	First semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process designed for this course is based on the following methodologies: Theoretical sessions, Problem-solving Sessions, Practical sessions, Technical visits, and Teamwork.

5.2.Learning tasks

28913 - Engines and machines

The program that the student is offered to achieve the expected results includes the following activities:

- Theoretical sessions. The teacher explains the theoretical content of each session promoting the participation of the students and the cooperative learning.
- Problem-solving sessions. Students, working individually or in groups, gain knowledge and skills by working to respond problems and questions.
- Practical sessions. Students, working in groups, gain knowledge about the characteristics and regulations of the main agricultural machines. A report of each practical session is required.
- Technical visits. Students visit a manufacturer of agricultural machinery and a fair of agricultural machinery.
- Teamwork. Students, working in groups, develop a specific project which must be exposed orally to the other students.

5.3.Syllabus

Theory

MODULE 0. PRESENTATION OF THE SUBJECT

0.-Introduction, methodology, systems of evaluation

.

MODULE 1. RECIPROCATING INTERNAL COMBUSTION ENGINES.

1.-Basic concepts of thermodynamics, static and dynamic.

2.-Real cycles of power.

3.-Reciprocating internal combustion engines.

4.-Performance and characteristic curves of the engine.

MODULE 2. TRACTORS

5.-Tractor transmission.

6.-Hydraulic equipment of the tractor. Couplings.

7.-Balance of the tractor. Steering, brakes and tyres. Rolling and skidding.

MODULE 3. WORKING THE LAND

8.-Equipment for preparatory and primary work and for follow-up.

28913 - Engines and machines

MODULE 4. THE DISTRIBUTION OF PRODUCTS

9.-Machinery for the application of fertilizers.

10.-Machinery for sowing, planting and transplanting.

11.-Machinery for protecting crops.

MODULE 5. GATHERING THE HARVEST

12.-Machinery for gathering forage and machinery for gardening.

13.- Machinery for the harvesting of cereals and fruit.

MODULE 6. SELECTION, COSTS AND MANAGEMENT OF THE MACHINERY

14.- The cost of using farm machinery. Work capacity of farm machinery.

MODULE 7. NEW TECHNOLOGIES IN FARM MACHINERY .

15.- New technologies in farm machinery.

Practicals

Laboratory Practicals

PRACTICAL 1. THE FARM TRACTOR. (lessons 3 to 7)

a) Constituent parts.

b) Engines.

c) Equipment coupling systems.

PRACTICAL 2. THE RECIPROCATING INTERNAL COMBUSTION ENGINE (lessons 3 to 7)

a) Constituent parts.

b) Technical characteristics

PRACTICAL 3. THE TRANSMISSION SYSTEM. (lessons 3 to 7)

28913 - Engines and machines

a) Types of transmissions.

b) Graph of speed of displacement - engine speed.

PRACTICAL 4. SPRAY NOZZLES. (lesson 10)

a) Types of nozzle.

b) Graph of delivery of different types of nozzle.

c) Transverse delivery of a nozzle-carrying bar.

Fidel Practicals

PRACTICAL 1. THE MACHINERY PARK. (all lessons)

a) Component machinery of a machinery park.

PRACTICAL 2. THE SPRAYER (lesson 10)

a) Constituent parts.

b) Regulation of a hydraulic sprayer.

Technical Visits

VISIT 1. COMPETITION AT FAIRS. (all lessons)

a) Fira de Sant Miquel (Lérida).

VISIT 2. A FARM MACHINERY COMPANY (all lessons)

a) KUHN IBÉRICA S.A.L. (Huesca)

Tasks

Seven tasks on farm machinery

5.4.Course planning and calendar

28913 - Engines and machines

Type Activity/week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Presential activity																					
Theory	2	2	2	2	0	2	2	2	2	2	2	2	2	2			2				
Problems				2	2						2			2			2				
Laboratory sessions						2	2		2	2											
Team work																					
Field practice	3												4				4				
Evaluation																			3		
Non presential work																					
Individual work	4	4	6	4	6	4	4	5	4	4	4	6	2	4	8	6	2	8	3		
Team work											1,5		1,5			2					
TOTAL	9	8	8	8	8	8	8	7	8	8	9,5	8	9,5	8	8	8	10	8	3		

5.5.Bibliography and recommended resources

BB-Basic bibliography

- BB Arnal Atarés, Pedro V.. Tractores y motores agrícolas / por Pedro V. Arnal Atarés , Antonio Laguna Blanca . - 3a. ed., rev. y amp., reimpr. Madrid : Ministerio de Agricultura, Pesca y Alimentación, Secretaría General Técnica : Mundi-Prensa, 2005
- BB Laguna Blanca, Antonio. Maquinaria agrícola : constitución, funcionamiento, regulaciones y cuidados / por Antonio Laguna Blanca . - 3ª ed. Madrid : Ministerio de Agricultura, Pesca y Alimentación, Secretaría General

28913 - Engines and machines

Técnica, 1999
- BB Ortiz-Cañavate, Jaime. Las maquinas agrícolas y su aplicación / por Jaime Ortiz- Cañavate ; con la colaboración de Javier García Ramos ... [et al.] . - 6a. ed. rev. y amp. Madrid [etc.] : Mundi-Prensa, 2003
- BB Ortiz-Cañavate, Jaime. Tractores : técnica y seguridad / Jaime Ortiz-Cañavate ; con la colaboración de: Jacinto Gil Sierra...[et al.] Madrid [etc.] : Mundi-Prensa, 2005
- BB Segura Clavell, José. Termodinámica técnica / Jose Segura Clavell Barcelona [etc.] : Reverté, D.L.1990

English-Friendly:

- Bell, Brian. (2016). Farm machinery. Old Pond, 6a. ed.
- Goering, Carroll E., Hansen, Alan C. (2004). Engine and tractor power. American Society of Agricultural Engineers, 4a. ed.

The updated recommended bibliography can be consulted in:
http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=8074