Universidad Zaragoza

Academic Year/course: 2023/24

28913 - Engines and machines

Syllabus Information

Academic year: 2023/24
Subject: 28913 - Engines and machines
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 583 - Degree in Rural and Agri-Food Engineering
ECTS: 6.0
Year: 2
Semester: First semester
Subject type: Compulsory
Module:

1. General information

This subject provides the basic knowledge of the operation of agricultural engines and machines, as well as the methods of calculating the power required to carry out certain tasks and the costs of using agricultural machinery.

These approaches and objectives are aligned with some of the Sustainable Development Goals (SDGs) of the Agenda 2030 and certain specific targets (https://www.un.org/sustainabledevelopment/es/), contributing to some extent to their achievement:

Goal 2.- Zero Hunger, target 2.4

Affordable and non-polluting energy, goal 7,a

2. Learning results

Applies the basic knowledge about the operation of machinery elements and alternative internal combustion engines applied to agricultural, horticultural and gardening machinery.

Provides technical advice on classification and application in the following areas: tillage and land preparation, distribution of products, harvesting and mechanization of other agricultural works.

Solves real problems about power, skidding and tipping of the tractor and implement assembly. Maximum traction capacity of a tractor-machine/harvester assembly.

Performs experimental analysis of phytosanitary treatment machinery.

Learn about the latest technologies incorporated into agricultural machinery by attending trade fairs and/or companies in the sector.

Solves specific problems of selection, replacement and regulation of agricultural, horticultural and gardening machinery Applies knowledge of machinery to the emergence of new technologies.

3. Syllabus

0.-Introduction, methodology and evaluation systems

1.-Basic concepts of thermodynamics, statics and dynamics

2.-Real power cycles

3.-Alternative internal combustion engines

4.-Engine performance and characteristic curves

5.-Tractor transmission

6.-Hydraulic equipment of the tractor. Oil hydraulic drives. Hooks

7.-Tractor balance. Steering, brakes and tires. Rolling and skidding

8.-Equipment for preliminary tillage, primary tillage and complementary tillage

9.-Fertilizer distribution machinery

10.-Sowing, planting and transplanting machinery

11.-Crop protection machinery

12.-Fodder harvesting machinery and gardening machinery

13.- Cereal and fruit harvesting machinery

14.- The cost of using agricultural machinery. Working capacity of agricultural machinery

15.- New technologies in agricultural machinery

4. Academic activities

Theory classes are held in the classroom. Students will be provided with the support material for the follow-up of the subject in the ADD. It is also advisable that they take notes during the development of the sessions. (30 hours)

In the problem classes the teacher will pose several problems to be solved, and after a deliberation with the students, they will solve and discuss their results. The students will have the results of the problems in the ADD. (16 hours) For the laboratory practice sessions, the group will be divided into subgroups, for which the teacher will present the case to be solved and the students will approach this resolution, as well as the evaluation of the results obtained. (10 hours) Information on the content of the technical visits will be provided the week prior to the visit . (4 hours)

For group work, students will be given the option to propose topics to be dealt with on their own initiative, which may or may not be accepted by the teacher . Likewise, the teacher will propose several topics to be developed so that each group of students can choose one of them to carry out the work.

Study, Teaching assignments and other activities (87 hours)

Assessment (3 hours).

5. Assessment system

The assessment of this subject willNOT be done on a continuous basis.

The following assessment tests will be carried out in each of the two sessions:

1. Presential written test of theory contents, problems and laboratory practices. In order to pass the subject a minimum of 5 out of 10 will be required in the problem part.
2. Group work carried out during the term.
3. Report on visits to companies.

Test 1 will be structured in multiple-choice questions of theoretical content (20%), in short answer questions of theory (50%) and problem solving (30%).

Test 2 will be evaluated through the delivery of the corresponding documents and their public exhibition on the date of final exam in each session. It may be passed during the course on a date that will be communicated sufficiently in advance to the students.

Test 3 will be evaluated through the delivery of the corresponding reports on the date of the final exam in each call.

The 3 assessment activities will be graded from 0 to 10 points.

Final grade:

To obtain the final grade (CF) in the subject, the weight of the 3 tests will be:

Test 1: 90%

Test 2: 5%

Test 3: 5%

If the minimum requirements are not reached in the assessment activity (5 out of 10 in the problems part of the test 1) the subject will not be considered passed, even if the final grade averaged CF, is equal or higher than 5. In this case, the final grade that will be reflected in the course transcripts will be:

If final grade averaged, CF > 4, Fail, 4. If final grade averaged, CF < 4, Fail, CF.

Success rates of the last years: 2019/20: 79,41%; 2020/2021: 71,43%; 2021/2022: 72,50%