Course guide
390411 - MHEV - Horticultural and Green Space Mechanisation

Last modified: 22/05/2025

Unit in charge: Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit: 745 - DEAB - Department of Agri-Food Engineering and Biotechnology.

Degree: BACHELOR'S DEGREE IN AGRICULTURAL, ENVIRONMENTAL AND LANDSCAPE ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: EMILIO GIL MOYA

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Engineering of gardens, parks, sport zones and horticultural exploitation: Horticultural and gardening machinery.

Transversal:
2. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

TEACHING METHODOLOGY

Theoretical classes in the form of participatory master classes with important interaction between teacher and student and between students.
Sessions of work in classroom: practical instrumental development of the concepts of theory through exercises of increasing difficulty during the development of the program. Reading and discussion of technical texts and presentation of problems and / or real situations proposed by students. This type of activities will always be developed in a group to promote teamwork and multidisciplinarity.
Lab sessions and field sessions, to which the student will have the opportunity to check, analyze and evaluate the
Behavior of the teams, applying the knowledge acquired to the theory sessions and in the problem sessions

LEARNING OBJECTIVES OF THE SUBJECT

It is intended that the student, upon successful completion of the subject, be able to know the basic fundamentals of mechanization in horticultural and fruit production, establish criteria for the analysis of the operation of different equipment, select them appropriately, according to technical criteria , Economic and environmental, the appropriate equipment for each particular case. Calculate, evaluate and analyze the cost of use of agricultural machines and solve global problems of selection and use of equipment. Select, use and evaluate the equipment necessary for the mechanization of green spaces and adapt the use of the equipment to the specific social and environmental requirements of the gardening sector and green spaces.

STUDY LOAD

Type	Hours	Percentage
Hours small group	20,0	13.33
Self study	90,0	60.00
Hours large group	40,0	26.67

Total learning time: 150 h

CONTENTS

AGRICULTURAL TRACTORS

Description:
Historical evolution and type of tractors. Characteristics of a tractor according to the work to be done. The tractor to the green spaces. The tractor engine. Power, torque and specific consumption. Transmission and hydraulic equipment of the tractor. Enganchel: Specific characteristics. Power rush. Four wheel drive. Tool coupling. Traction and taxiing. Tractor tests. The powers of the tractor. Power tests. Characteristic curves.

Related activities:
ACTIVITY 1: Theoretical explanations
Activity 2: Individual evaluation tests
Activity 3: Pratical activity: laboratory, computers and field practices

Full-or-part-time: 12h
Theory classes: 4h
Self study : 8h

OPERATIONAL LABOR AT FARM. ASSOCIATED FARM MACHINERY

Description:
Equipment for soil preparation: Objectives of soil work. Primary work tools. Secondary work and preparation of the seed bed. Combination of tools. Techniques of minimum work or simplified work.

Machinery for the distribution of fertilizers, planting and protection of crops: Type of fertilizers and their main characteristics. Regulation of fertilizers. Semigadoras volumétricas and seeders monograno. Planters. Seed selection and regulation criteria. Machinery for crop protection: General characteristics of the dusting. Type of equipment and its relation to crops. Main elements. Criteria for selection and regulation of equipment.

Harvesters: Grain harvesters. Main elements. Regulations and adjustment. Equipment for harvesting of roots and tubers. Other harvesters. Systems of assistance to the manual collection. Vibrators. Harvesters of vegetables. Harvesting.

Mechanization of green spaces. Singularities. Management of parks of machinery by gardening

Related activities:
Activity 1: Classes of theoretical explanation
Activity 2: Individual assessment tests
Activity 3: Field / Laboratory Practices
Activity 4: Practices in Computer Classroom
Activity 5: Case studies /Exercicies

Full-or-part-time: 40h
Theory classes: 8h
Laboratory classes: 8h
Self study : 24h

AGRICULTURAL MACHINERY OPERATIONAL COSTS. SELECTION PROCEDURE

Description:
The cost of using agricultural machinery. Fundamental principles. Methodology of calculation. Comparative analysis of methods. Selection of equipment. Fundamental criteria. Methodology for the selection and renovation of the machinery park. New technologies for agricultural mechanization: precision agriculture.

Related activities:
Activity 1: Classes of theoretical explanation
Activity 2: Individual assessment tests
Activity 4: Practices in Computer Classroom
Activity 5: Exercise / problem resolution

Full-or-part-time: 25h
Theory classes: 6h
Laboratory classes: 4h
Self study : 15h

SPRAYING TECHNOLOGY FOR CROP PROTECTION

Description:
European and national regulations on crop protection. Application technologies. Dose expression. Measurement and reduction of drift. Nozzle technology. Application of phytosanitaries in green areas and in horticultural production: singularities. Regulation. Inspection of application equipment.

Related activities:
Activity 1: Classes of theoretical explanation
Activity 2: Individual assessment tests
Activity 3: Field / Laboratory Practices
Activity 4: Practices in Computer Classroom

Full-or-part-time: 73h
Theory classes: 22h
Laboratory classes: 8h
Self study : 43h

ACTIVITIES

ACTIVITY 1: THEORETICAL LECTURES

Full-or-part-time: 95h
Self study: 57h
Theory classes: 38h

ACTIVITY 2: INDIVIDUAL EVALUATION TESTS

Description:
Three parts will be organized: a first part of visual reconeixement of diferents tipus of machines; A second part consistent in a test tip test (V or F); I a third part of problem solving. At the end of the course the student will complete a presentation of each subject (individually or in groups of two) of a subject selected voluntarily at the beginning of the course (the teacher will offer a list of subjects) . The treball is to present a periport to perform an oral presentation to the class during the last session of the course.

Full-or-part-time: 2h
Theory classes: 2h

ACTIVITY 3: PRACTICAL ACTIVITIES /LABORATORY AND FIELD TRIALS

Description:
Different field tests will be carried out with the equipment available in the agricultural mechanization laboratory. These are mixed laboratory and field activities in which the student learns how to handle, calibrate and evaluate different equipment.

Full-or-part-time: 26h
Self study: 16h
Laboratory classes: 10h

ACTIVITY 4: PRACTICAL LECTURES IN COMPUTERS' ROOM

Description:
In these activities the student will be able to work in a variety of eines for the management, selection of agricultural machinery. Examples of costs of utilization costs will be made available, as well as the results of the laboratory tests, and will be used to manage creatine software programs for a greater management of agricultural machinery.

Full-or-part-time: 21h
Self study: 13h
Laboratory classes: 8h

ACTIVITY 5: CASE STUDIES AND EXERCISES

Description:
Organized in small groups the students will work with different case studies related with agricultural machinery

Full-or-part-time: 6h
Self study: 4h
Laboratory classes: 2h

GRADING SYSTEM

N1: Theory (40%): Evaluation activity 2. Two exams will be done, one half and the other at the end of the semester. Each exam will be worth 50% of the theory grade.
N2: Presentation in the classroom (10%): The quality of the document presented by the student, as well as the quality of the oral presentation will be evaluated.
N3: Problem solving (10%): Evaluation of activities 4 and 5. The documents presented by the student will be evaluated at the conclusion of the problem sessions.
CG: Practices (40%): Assessment activity 3. Attitude and aptitude will be assessed during the development of the practices, as well as the report prepared at the end of each working session. It will evaluate the dynamization of working groups, resolving potential conflicts, assessing the work done with other people and evaluating the effectiveness of the team.

Evaluation formula:

Nfinal = 0.4N1 + 0.1N2 + 0.1N3 + 0.4CG