

Academic Year/course: 2021/22

28927 - Fruit Growing

Syllabus Information

Academic Year: 2021/22

Subject: 28927 - Arboricultura

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 583 - Degree in Rural and Agri-Food Engineering

ECTS: 6.0

Year: 3 and 4

Semester: Second semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

The subject and its expected results respond to the following approaches and objectives:

The subject has as a global objective that the students know and understand the principles of the bases of the Arboriculture, so that they can use them in the development of their professional activity. Linked to these bases, they must also relate them to understand the production systems at the level of exploitation, applying the most appropriate technologies of the production process.

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

Goal 2: Zero hunger

Target 2.3: By 2030, double the agricultural productivity and income of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishermen, including through secure and equitable access to land, other production resources and inputs, knowledge, financial services, markets and opportunities for the generation of added value and non-agricultural jobs.

Goal 4: Ensure inclusive, equitable and quality education and promote lifelong learning opportunities for all

Target 4.7 By 2030, ensure that all students acquire the knowledge and skills necessary to promote sustainable development, including through education for sustainable development and sustainable lifestyles, human rights, gender equality, the promotion of a culture of peace and non-violence, global citizenship and the appreciation of cultural diversity and the contribution of culture to sustainable development.

Goal 12: Sustainable consumption and products

Target 12.2: By 2030, achieve sustainable management and efficient use of natural resources.

Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release into air, water and soil in order to minimize their adverse effects on human health and the environment.

- Goal 13: Take urgent action to combat climate change and its effects

Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

1.2. Context and importance of this course in the degree

The subject is offered in the 2nd semester of the third year, once the students have already studied the biological bases of plants, have acquired skills on the soil and have learned to classify botanical species. These previous competences, together with those acquired in other subjects, provide a good basis for the development and complement of plant production, which is one of the basic pillars of the degree.

1.3. Recommendations to take this course

To properly follow this subject it is very convenient that the student has achieved the learning results provided in the subjects of: Biology, Geology, Edaphology and Climatology, Botany and knowledge of phytotechnics. They should also be able to read basic English.

2. Learning goals

2.1. Competences

By passing the subject, the student will be more competent to...

Generic (cross-sectional)

- CB.4. That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized audience
- CB.5. That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy
- CG.2. That students have the ability to use information and communication technologies applied to their field of work.
- CG.3. That students have the ability to work as a team. Specific
- CE.23 Capacity to know, understand and use the principles of plant production technologies: agro-energy production and exploitation systems.
- Knowledge of woody species and their ecological environment.
- Analysis of woody crop production systems.
- Management of woody crop plantations.

2.2. Learning goals

The student, to overcome this subject, must demonstrate the following results...

Arboriculture must provide the student with sufficient knowledge about useful agronomic techniques and enable him to interpret the effects of various production techniques in the face of real and concrete situations, with sensitivity to environmental issues. These results are linked to SDGs 4.7, 12.2, 12.4, 13.3.

Likewise, the student must know the bases of Arboriculture, develop the capacity for analysis to identify, quantify and propose solutions to solve problems of the management of fruit trees, of the different cultivation techniques, as well as demonstrate the ability to apply knowledge in practice. These results are linked to SDGs 2.3, 4.7, 12.2, 12.4.

The student will show their ability to perform individual tasks, teamwork and practice reports; making appropriate use of ICT (word processor, spreadsheet, bibliographic searches on the Internet ...) in the different teaching activities proposed. This result is linked to SDG 4.7

Intertwined, in a transversal way, to these learning outcomes are all the objectives and goals of the SDGs mentioned in point 1.1, which are the most linked to this subject.

2.3. Importance of learning goals

The competences acquired in this subject are relevant because they allow to understand the agronomic aspects of the productive process and to develop the student's capacity to manage the influence of the ecological environment for the development and fruit production, as well as the planning of the cultural practices necessary to obtain the quality appropriate to the production objectives set.

3. Assessment (1st and 2nd call)

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

The student must demonstrate that he/she has achieved the expected learning outcomes through the following assessment activities:

The subject of Arboriculture will be evaluated by means of the realization of a global test (equal in the two announcements) that will be divided into the following sections:

1. Test written at the end of the semester, according to the syllable of the subject and according to the calendar of exams of the EPS
2. Written and oral presentation of the two course papers.
3. Resolution of the questionnaires maintained in Moodle.

Evaluation Criteria

The evaluation system will be the same in all calls proposed by the Center and will include the acquisition of knowledge, skills and attitudes specific to the subject.

To pass the subject it will be necessary to achieve a minimum score of 4 points out of 10 in section 1. If the minimum

requirements are not reached in the activities of evaluation of the subject will not be considered approved, although the final grade averaged, is equal to or greater than 5. In that case the note which shall appear in the minutes shall be suspended with the qualification of the test referred to in paragraph 1.

1. Global face-to-face test written at the end of the semester (60%), according to the syllable of the subject and according to the calendar of exams of the EPS. It must be approved in the call because no note is kept of any section for the next call. The test consists of:

1.1. Test-type questions, which will consist of several multiple choice questions so that each of the answered correctly will be assigned a positive score, and the one answered erroneously, will be rated with a negative score, while the unanswered ones will be scored with 0 points

1.2. Short questions to be developed in which the accuracy of the answer and the order in the drafting will be assessed. Every completely correct answer will be rated positively, while completely wrong answers do not qualify in this section.

1.3. Examination "de visu" of aspects related to the subject studied throughout the semester.

2. Elaboration of the memory, exhibition and public defense of two practical works on the effects of a cultivation technique in the fruit crop.

The report will be made individually. This report must be prepared following the guidelines and the format of presentation that will be marked in the practical program of the asignatura at the beginning of course. The work will be exposed and defended by each student in practical session, in which the author must intervene to explain and argue some of the points contained in the report, debate them and discuss them with the rest of the participants (teacher and students). The time available for the presentation and defense of the topic during the sessions will be 5-10 minutes. The list of works and the date of defense will be provided at the beginning of the course along with the calendar of the rest of the teaching activities of the subject.

The works presented will go through anti-plagiarism tools before their correction, leaving as not presented the one that presents a high level of copy. Both the written memory and the presentation and its defense will be evaluated according to the following criteria: clarity and order of memory, ability to work, ability to adequately transmit information during the presentation, and ability to debate during the defense of the chosen topic. These evaluation criteria will accredit the achievement of the CG 5 learning competence.

The grade obtained in this evaluation will be maintained for the second call, in the case of not passing the first. The evaluation of this test will represent 30% of the final grade.

1. The resolution of all the questionnaires that appear in the Moodle of the asignatura, related to each topic and reading, can be solved, assuming a 10% of the final note.

Students who, having passed, want to upload grade and all those students who do not submit the report on the agreed date, must take an individual written test on the same day that appears in the calendar of exams of the EPS on the contents of practices and papers presented.

In relation to the SDGs, and in particular to targets 2.3, 12.2, 12.4, and 13.3, the theoretical and practical basis is included in the various sections of the evaluation, with the activity of preparing the work of progress being the activities most committed to targets 12.2 and 12.4. While the questions derived from the laboratory practices are oriented, in addition, to the goal 2.3.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that has been designed for this subject is based on the following:

Theoretical sessions

They will consist of expository and participatory lessons. Cabinet and laboratory practices. These will be demonstrative-active-interrogative activities in which students will learn various techniques and procedures and train their ability to observe, analyze and critically.

Practices in greenhouse, field and laboratory

They are guided practical activities, the content is about applied aspects of the theoretical sessions. These activities will be carried out in the facilities of the Higher Polytechnic School, both in the greenhouse, laboratory or in the field of practice. These are participatory-active interrogative activities.

Special practice

It will consist of visits to various companies where the student can observe and analyze some of the contents and processes studied in the theoretical classes to test their ability to observe, analyze and synthesis. These are purely participatory-active interrogative activities.

Tutorials

These are sessions, at the request of the students, to solve any type of doubts both of the theoretical sessions and of the practices. In particular, they are highly recommended to focus the preparation of practice work; in this case they will consist of at least one scheduled tutoring.

Non-Face-to-Face Activities

They consist of the reading and understanding of the theoretical knowledge material and the resolution of the exercises proposed during the theory, practices and field sessions. These activities will be carried out with full hourly freedom.

Tests

Preparation and conduct of exams. It includes the oral presentation of the internship papers.

4.2. Learning tasks

The subject consists of 30 face-to-face hours of master class that will be taught on a regular basis during the 15 weeks of duration of the semester, 6 face-to-face hours dedicated to the resolution of problem and cases, 14 face-to-face hours dedicated to the realization of practices in laboratory, greenhouse or practice plot, 7 face-to-face hours of visit to fruit farms or fruit fair. The coursework is divided into a tutored session (2 h) and the exposition of the same (1 h).

4.3. Syllabus

The course will address the following topics:

Theoretical program

1. Interactive lectures (activity type 1) ? 30 hours/student

Module I ? Morphology and physiology of fruit trees

I.1 Morphology of fruit trees

I.2 Blooming to ripening - cycles

Module II ? Multiplication of fruit trees

II.1 Sexual and asexual multiplication (micropropagation)

II.2 Asexual multiplication (layers and rootstocks)

II.3 Grafts

Module III ? Planting techniques

III.1 Soil and climate

III.2 Planting techniques

Module IV ? Fruit tree cultivation techniques

IV.1 Pruning and thinning out

IV.2 Shape pruning

IV.3 Soil maintenance

IV.4 Fertilization

IV.5 Irrigation

IV.6 Pest and disease control

IV.7 Harvesting and storage

Module V ? Regulations

V.1 Organic production, integrated production and CMO in fruits

Content of practical sessions

2. Resolution of problems and cases (activity type 2) ? 6 hours/student

i.1 Selection of growing areas through GIS

i.2 Strategical alternatives

3. Laboratory practice (activity type 3) ? 14 hours/student

a.1 Description and identification of fruit trees

a.2 Fruit quality

a.3 Pruning and pruning systems

a.4 Sexual and asexual multiplication

a.5 Grafts

a.6 Pest and disease control

4. Special practice (activity type 4) ? 6 hours/student

Given the importance of direct contact with fruit culture, an external visit has been scheduled for students to know orchards with different production goals.

5. Tutorials, revision, and presentation of projects (activity type 6) ? 4 hours/student

6. Teaching project (activity type 6) ? 16 hours/student

Preparing and presenting a practical project (workshop type). The topics for this activity will be suggested at the beginning of the course.

7. Study (activity type 7) ? 74 hours/student

The global final test in accordance with the Regulation of Learning Assessment Standards of the University of Zaragoza.

4.4. Course planning and calendar

To-face sessions and presentation of papers

The approximate temporal distribution is shown in the attached table, taking into account that the exits to the agricultural holdings will be conditioned on the availability of the holdings to be visited.

Tipo actividad / Semana	1	2	3	4	5	6	7	8	9	10	11	12 (1)	13	14	15	16
Actividad Presencial																
Teoría	2	2	2	2	2	2	2	2	2		2	4		2	2	2
Problemas														2	2	
Prácticas laboratorio	2	2		2		2	2		2		2					
Trabajos en grupo			2													
Salidas de prácticas								4					4			
Tutorías ECTS																
Evaluación						1										1
Actividad No presencial																
Trabajo individual				2	2		2	2	2		2	2	2			
Trabajo en grupo	5	5	5	5	5	5	5	5	5		4	5	5	5	5	5
TOTAL	9	9	9	11	9	10	11	13	11	0	10	11	11	9	9	8

(1) Wednesday, April 27, will follow Monday's schedule

All the teaching material used by the teacher in the theoretical and practical classes will be available to the students in the Reprography Service of the Higher Polytechnic School and in the Moodle platform well in advance.

The teaching activities of the subject include the realization of works, with the advice and tutoring of the teacher, in which the characteristics of the written report, the clarity, order and the ability to answer the questions that arise during the oral presentation before the teacher and the rest of the group will be valued. The date of public defense of these works will be provided at the beginning of the course along with the calendar of the rest of the teaching activities.

The written test will be carried out on the dates set by the center for each call.

4.5. Bibliography and recommended resources

- BB** Agustí Fonfría, Manuel. Fruticultura / Manuel Agustí. Madrid : Mundi-Prensa, 2004
- BB** Baldini, Enrico. Arboricultura general / Enrico Baldini ; versión española de José de la Iglesia González. Madrid : Mundi-Prensa, 1992
- BB** Gil Salaya, Gonzalo F. Fruticultura : el potencial productivo : crecimiento vegetativo y diseño de huertos y viñedos / Gonzalo F. Gil Salaya. 2ª ed. Santiago : Alfaomega : Ediciones Universidad Católica de Chile, cop. 1999
- BB** Gil Salaya, Gonzalo F. Fruticultura : la producción de fruta : fruta de climas templado y subtropical y uva de vino / Gonzalo F. Gil Salaya. Santiago, Chile : Ediciones Universidad Católica de Chile, 2000
- BB** Gil-Albert Velarde, Fernando. El cultivo de las plantaciones frutales / Fernando Gil-Albert Velarde. Madrid : Mundi-Prensa, 2015
- BB** Gil-Albert Velarde, Fernando. Tratado de arboricultura frutal. Vol. I, Morfología y fisiología del árbol frutal / Fernando Gil-Albert Velarde. 3ª ed. rev. Madrid : Ministerio de Agricultura, Pesca y Alimentación : Mundi-Prensa, 1991

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- BB** Gil-Albert Velarde, Fernando. Tratado de arboricultura frutal. Vol. IV, Técnicas de mantenimiento del suelo en plantaciones frutales / Fernando Gil-Albert Velarde. Madrid : Ministerio de Agricultura, Pesca y Alimentación : Mundi-Prensa, 1991
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- BB** Urbina Vallejo, Valero. El sistema productivo en explotaciones frutales/Valero Urbina Vallejo. Lleida: Paperkite 2000
- BB** Urbina Vallejo, Valero. Propagación de los frutales / Valero Urbina Vallejo . Lleida : Paperkite, 2005
- BC** Bretaudeau, Jean. Poda e injerto de frutales / Jean Bretaudeau ; versión española de Vicente Sotes Ruiz y Manuel Vázquez-Prada Grande, Elisa Boix Aristu. 1ª ed., 4ª reimp. Madrid : Mundi-Prensa, 1991
- BC** Cambra Ruiz de Velasco, Mariano. Diseños de plantación y formación de árboles frutales / M. Cambra, R. Cambra Ruiz de Velasco. [9a. ed.]. Madrid : Consejo Superior de Investigaciones Científicas, 2004
- BC** Coutanceau, M. Fruticultura : Técnica y economía de los cultivos de Rosáceas leñosas productoras de fruta / M. Coutanceau. 3ª ed. Traducción, adaptación y prólogo de la 1ª edición española [por] Juan Simarro, ampliación y puesta al día de la 2ª y 3ª edición española [por] Antonio J. Felipe Mansergas. Barcelona : Oikos-Tau, 1977 (reimp. 1997)
- BC** Frutticoltura ad alta densità : impianti, forme d'allevamento e tecniche di potatura / a cura di S. Sansavini, A. Errani. 1ª ed. Bologna : Edagricole, 1998
- BC** Gautier, Michel. La culture fruitière. Vol. 1, L'arbre fruitier / Michel Gautier. 2e. éd. rev. et augm. Paris : Tec & Doc-Lavoisier, 1993
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- BC** La qualite gustative des fruits : méthodes pratiques d'analyse / auteurs, Françoise Alavoine... [et al.]. Aix en Provence : CEMAGREF, 1988
- BC** Lalatta, Filippo. Fertilización de árboles frutales / Filippo Lalatta. Barcelona : CEAC, 1988
- BC** Martínez de Toda Fernández, Fernando. Claves de la viticultura de calidad : nuevas técnicas de estimación y control de la calidad de la uva en el viñedo / Fernando Martínez de Toda Fernández. Madrid [etc.] : Mundi-Prensa, 2008
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- BC** Urbina Vallejo, Valero. Mantenimiento del suelo en plantaciones frutales / Valero Urbina Vallejo. Lleida: Paperkite 2018
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