Universidad Zaragoza

Academic Year/course: 2022/23

28930 - Horticultural production

Syllabus Information

Academic Year: 2022/23
Subject: 28930 - Horticultural production
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 583 - Degree in Rural and Agri-Food Engineering
ECTS: 6.0
Year:
Semester: Second semester
Subject Type: Optional
Module:

1. General information

1.1. Aims of the course

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

The subject aims to:

Provide the basic knowledge (species, use, origin, varieties, fertilizer needs, crop installation) of horticultural production.

To introduce the cultivation calendars and the edaphoclimatic needs of the main horticultural species.

To initiate in the calculation of the main greenhouse elements.

To provide knowledge on the main substrates and production methods used in horticulture.

These objectives are aligned with some of the Sustainable Development Goals of the 2030 Agenda and certain targets, specifically goal 2, target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fisherfolk, including through secure and equitable access to land, other production resources and inputs, knowledge, financial services, markets and opportunities for value addition and off-farm employment generation.

1.3. Recommendations to take this course

The course is offered in the second quarter of the third year, once students have already taken subjects such as Plant production, Botany, Resistance of Materials, Engines and Machines and Rural Electrification, in addition to the basic subjects. The competencies acquired in this course can be complemented with other subjects taken later.

2. Learning goals

2.2. Learning goals

The student, in order to pass this course, must demonstrate the following results:

Ability to know, understand and use the principles of horticultural production technology.

Describe the basics and technology of horticultural propagation and production; quality control of horticultural products and marketing.

Explain the main characteristics of plant material used in horticultural crops.

Calculate and design the elements that are part of a greenhouse.

Application of the basic knowledge of “visu” recognition of plant material.

All these learning outcomes contribute to achieving SDG 2: Zero Hunger.

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 evaluation activities:

There will be a global, single assessment, with different evaluation instruments, with the following distribution:

Course activity	(%)
Course work	20
Problem solving	10
Report of visits	10
Recognition exam (*)	*
Final exam	60

(*)Passing the recognition exam is considered an essential requirement to pass the course.

The course work will be done individually. The topic will be chosen by the students from the list presented by the professor. The topics will be varied, topical and related to the content of the course. The papers must be presented in writing and a 10-minute presentation must be made.

These instruments will be applicable to all the calls, in case of not having carried out the visits it will be necessary to carry out a work on the typology of the visited companies. The date for the presentation of the work will be agreed with the students, while the recognition exam will coincide with the date of the final exam proposed by the Center for this subject. If the student has not passed some of these evaluation tests during the course, he/she will be able to retake them through the global evaluation on the date set by the center.

Success rate in previous years

2018/2019	2019/2020	2020/2021
83,33%	100,00%	100,00%

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

This course studies the techniques of horticultural crop and crop characteristics of the main vegetables. It is divided into two main sections. In the first general aspects of horticulture and greenhouse technology is addressed and in the second the agronomic characteristics of the main species of vegetables are studied.

- Theoretical lessons in the classroom.
- Practical sessions in lab
- Tutorial sessions.
- Field visits.

4.2. Learning tasks

The course includes the following learning tasks:

- I. General aspects of horticulture and greenhouse technology. Lectures and practice sessions.
- II. Characteristics of the main species of vegetable. Lectures and practice sessions.
- III. Field visits.

4.3. Syllabus

Theoretica Programme

1. Introduction. Horticulture across the world, within the European Union and in Spain. Importance and principal characteristics of the sector.
2. Climate in horticulture. Climatic factors: light, temperature, water and wind. Carbon fertilisation.
3. Soil in horticulture. Organic and mineral fertilisation. Horticulture in specific soils. Cultivation in sand. Hydroponic crops. Nutritive solutions.
4. General techniques within horticultural cultivation. Propagation. Seedbeds. Ploughing. Irrigation. Use of growth regulators.

5. General cultivation techniques in horticulture. Crop rotation and the alternatives. Soil disinfection. Plant health defence and weed control.
6. Harvesting of horticultural products. General guidelines. Harvesting systems. Conservation of horticultural products. Postharvest handling. Conservation systems. Markets for horticultural products. Marketing standards and methods.
7. Horticultural plants cultivated for their roots. Species. Botanical classification. Economic importance. The carrot. Cultivation techniques.
8. Horticultural plants cultivated for their tubers. Species. Botanical classification. Economic importance. The potato. Cultivation techniques.
9. Horticultural plants cultivated for their bulbs. The *Allium* genus. Botanical classification. Economic importance. The onion and its cultivation techniques. Garlic and its cultivation techniques.
10. Horticultural plants cultivated for their stems. The asparagus. Economic importance. Cultivation techniques.
11. Horticultural plants cultivated for their leaves. Species. Botanical classification. Economic importance. The *Brassica* genus. Cultivation techniques. The lettuce and the endive and their cultivation techniques.
12. Horticultural plants cultivated for their inflorescence. Species. Botanical classification. The artichoke. Cultivation techniques.
13. Horticultural plants cultivated for their fruit. The solanaceae family. Botanical classification. Economic importance. Cultivation techniques of the tomato, the pepper and the aubergine.
14. Horticultural plants cultivated for their fruit. The cucurbitaceae family. Species. Botanical classification. Economic importance. Cultivation techniques.
15. Horticultural plants cultivated for their fruit. The strawberry. Species. Botanical classification. Economic importance. Cultivation techniques.
16. Horticultural plants cultivated for their pods/seeds. Species. Botanical classification. Economic importance. Cultivation techniques.
17. Cultivated mushrooms. General features. Taxonomy. Description. The common mushroom. Cultivation techniques. Other edible fungi.

Practical Programme

1. Crop programming. Crop calendar. Outdoor crops and protected cultivation.
2. Greenhouses. General characteristics. Greenhouse design. Types of cover. Thermal requirements. Estimation of heating needs.
3. Greenhouse design. Estimation of refrigeration needs. Refrigeration requirements in greenhouses. Design of a cooling system.
4. Recognition of the seeds of a variety of horticultural plants.
    4.1.- The solanaceae family (pepper, aubergine, tomato).4.2..- The asteraceae family (cardoon, artichoke, lettuce, escarole, endive, salsify).4.3.- The apiaceae family (celery, fennel, carrot, parsnip, parsley).4.4.- The cucurbitaceae family (melon, cucumber, watermelon, courgette, pumpkin).4.5.- The liliaceae family (asparagus, onion, leek, garlic)4.6.- The poaceae family (sweetcorn)4.7.- The rosaceae family (strawberry)4.8.- The brassicaceae family (turnip, cabbage, cauliflower, Roman cauliflower, broccoli)4.9.- The chenopodiaceae family (chard, beetroot, spinach).4.10.- The boraginaceae family (borage)
    4.11.-The leguminosae family (beans, peas)
5. Recognition of the plantlets of a variety of horticultural plants.
    5.1.- The solanaceae family (pepper, aubergine, tomato).5.2..- The asteraceae family (cardoon, artichoke, lettuce, escarole, endive, salsify).5.3.- The apiaceae family (celery, fennel, carrot, parsnip, parsley).5.4.- The cucurbitaceae family (melon, cucumber, watermelon, courgette, pumpkin).5.5.- The liliaceae family (asparagus, onion, leek, garlic)5.6.- The poaceae family (sweetcorn)5.7.- The rosaceae family (strawberry)5.8.- The brassicaceae family (turnip, cabbage, cauliflower, Roman cauliflower, broccoli)5.9.- The chenopodiaceae family ((chard, beetroot, spinach).5.10.- The boraginaceae family (borage)
    5.11.- The leguminosae family (beans, peas)
6. Substrata for horticulture.
7. Quality standards relating to the sale of vegetables.
8. Establishment of horticultural alternatives.
9. Vegetable grafting.

External visits:

Visits to a substratum production plant, a mushroom farm and a mushroom processing company in Autol-Pradejón in the province of La Rioja. Visit to an intensive horticultural farm near Zaragoza.

4.4. Course planning and calendar

Teaching activities will be carried out according to the following timetable

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

4.5. Bibliography and recommended resources

BB Alpi, A. Cultivo en invernadero : actual orientación científica y técnica / A. Alpi, F. Tognoni ; versión española [de la 4a. ed. italiana], C.I. Cerisola, con la colaboración de E. Domínguez Castillo. 3a ed. rev. y amp. Madrid : Mundi-Prensa, 1991

BB Fertirrigación : cultivos hortícolas, frutales y ornamentales / obra colectiva dirigida y coordinada por Carlos Cadahía. 3ª ed. rev., act. y ampl. Madrid [etc.] : Mundi-Prensa, 2005

BB Maroto Borrego, José Vicente. Elementos de horticultura general : especialmente aplicado al cultivo de plantas de consistencia herbácea / J.V. Maroto Borrego. 2a ed. rev. y ampl. Madrid : Mundi-Prensa, 2000

BB Maroto Borrego, José Vicente. Horticultura herbácea especial / J. V. Maroto Borrego. 5ª ed. rev. y amp. Madrid : Mundi-Prensa, 2002

BB Matallana Gonzalez, Antonio. Invernaderos : diseño, construcción y ambientación / Antonio Matallana Gonzalez, Juan Ignacio Montero Camacho. 2ª ed. rev. y amp. Madrid : Mundi-Prensa, 1995

BC Casal, J. Las plantas entre el cielo y el suelo. Buenos Aires: Eudeba, 2007 [Comentario del profesor: libro electrónico]

BC Castilla Prados, Nicolás. Invernaderos de plástico : tecnología y manejo / Nicolás Castilla. Madrid : Mundi-Prensa, 2005

BC Osca Lluch, J.M., Gómez de Barreda, D. Guía gráfica de cultivos herbáceos. Valencia: Universidad Politécnica, 2019 [Comentario del profesor: libro electrónico]

BC Resh, Howard M. Cultivos hidropónicos : nuevas técnicas de producción... / Howard M. Resh. 5a. ed., rev. y ampl. Madrid [etc.] : Mundi-Prensa, 2001

BC Tesi, Romano. Medios de protección para la hortoflorofruticultura y el viverismo / Romano Tesi ; versión española J.M. Mateo Box. Madrid [etc.] : Mundi-Prensa, 2001

BC Tratado de cultivo sin suelo / Miguel Urrestarazu Gavilán, director coordinador. 3ª ed., rev. y ampl. Madrid [etc.] : Mundi-Prensa, 2004

The updated recommended bibliography can be consulted in:http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28930