



Study Plan

School: School of Sciences and Technology
Degree: Master
Course: Olive Cultivation and Olive oil (cód. 652)

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
FIT10123	Olive Plant Material and Breeding	Agronomy	3	Semester	78
FIT12485	Integrated Pest Management of Olives I	Agronomy	6	Semester	156
ERU10125	Olive harvesting and logistic	Rural Engineering	3	Semester	78
FIT10126	Oil Millers and Olive Oil Technology	Food Engineering	6	Semester	156
FIT10127	Olive Technology	Food Engineering	6	Semester	156
FIT10129	Sensory analysis of olive oil	Food Engineering	3	Semester	78
ERU10128	agricultural Effluent Technology	Biosystems Engineering	3	Semester	78

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
GES10131	Marketing for olive oil products	Management	3	Semester	78
BIO10130	Olive Tree Morphology and Physiology	Biological Sciences	6	Semester	156
FIT10132	Olive Grove Planting	Agronomy	6	Semester	156
FIT10133	Olive Grove Growing	Agronomy	3	Semester	78
ERU10134	Soil Maintenance in olive grooves	Rural Engineering	3	Semester	78
ERU10135	Olive groove fertilisation and irrigation	Rural Engineering	6	Semester	156
FIT10136	Integrated Protection of Olive Grove II	Agronomy	3	Semester	78

2nd Year - 3rd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
FIT10137	Research Seminar in Olive Growing and Olive Oil	Agronomy	6	Semester	156
Dissertation					
Report					
Project Work					

2nd Year - 4th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
Dissertation					
Report					
Project Work					



Conditions for obtaining the Degree:

*** TRANSLATE ME: Para aprovação na componente curricular é necessário a aprovação (através de avaliação ou creditação) das seguintes unidades curriculares: { \ }newline

{ \ }newline

1º Semestre: { \ }newline

7 UC obrigatórias num total de 30 Ects { \ }newline

{ \ }newline

2º Semestre: { \ }newline

7 UC obrigatória num total de 30 Ects { \ }newline

{ \ }newline

3º Semestre: { \ }newline

1 UC obrigatória num total de 56 Ects { \ }newline

{ \ }newline

Para obtenção do grau, é necessário também a aprovação em Dissertação no total de 54 ECTS, no 3.º e 4.º Semestre. { \ }newline

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Program Contents

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Olive Plant Material and Breeding (FIT10123)

- Origin, distribution and botanical classification in *Olea* spp.
- Identification and characterization of olive cultivars according to COI descriptors.
- Molecular characterization of olive cultivars
- Main olive cultivars used on a national and international level
- Agronomical potential of olive cultivars used for olive oil production and table olives
- The olive propagation techniques; - Harwood cuttings and grafting; - Semi-hardwood cuttings; Micropropagation somatic embryogenesis and micro-grafting
- Olive plant Breeding.

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Integrated Pest Management of Olives I (FIT12485)

1. Introduction
2. Integrated disease and pest management (IPM)
 - 2.1. Components
 - 2.2. Damage risk assessment
 - 2.3. Economic threshold
 - 2.4. Control methods selection
3. Biotic diseases in olive crop
 - 3.1. The nematodes (*Meloidogyne* sp.)
 - 3.2. The olive anthracnose (*Colletotrichum acutatum* e *C. gloeosporioides*)
 - 3.3. *Cercospora* leaf spot of olives (*Pseudocercospora cladosporioides*)
 - 3.4. The olive rot root (*Phytophthora* spp., *Rosellinia necatrix* e *Armillaria mellea*)
 - 3.5. *Camarosporium dalmaticum* infecting olive fruits
 - 3.6. The sooty mould in olive trees (*Capnodium* spp., *Limacinula* spp. e *Aureobasidium* spp.)
 - 3.7. Viruses and phytoplasmas that infecting olive
4. Olive pests
 - 4.1. Olive fruit fly (*Bactrocera oleae*)
 - 4.2. Black scale (*Saissetia oleae*)
 - 4.3. Tabby knot-horn (*Euzophera pinguis*)
 - 4.4. Olive bark beetle (*Phloeotribus scarabaeoides*)
4. Material for pesticide application



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Olive harvesting and logistic (ERU10125)

Support equipment for manual harvesting of olives;

Equipment for mechanical harvesting of olives and their adequacy to the different olive orchards;

Handling and storage equipment for olives inside the farm

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Oil Millers and Olive Oil Technology (FIT10126)

All virgin olive oil technological process will be studied.

Physico-chemical basis of all process will be reviewed and several different technologies to obtain virgin olive oil will be focused.

Quality and process control will be emphasized.

Criteria to make a project in order to install an oil press will be providing.

The influence of virgin olive oil consumption and human health will be presented.

Module 1 – Preliminary operations. Process production.

Module 2 – Control process and storage.

Module 3 – Quality. Package.

Module 4 – Visits to press industries.

Module 5 – Industrial projects.

Module 6 – Olive oil benefits for human health. The olive oil role in Mediterranean diet context.

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Olive Technology (FIT10127)

1 – World olive production statistical data.

2 – Technology of green olives preservation

3 – Technology of black olives preservation

4 - Others technologies for olive preservation

5 – Olive nutritional value

6 – Project (olive preservation plant)

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Sensory analysis of olive oil (FIT10129)

General considerations:

The senses in sensory analysis. The physiology of the senses. The aroma, taste and texture. Sensory analysis vs sensory evaluation.

The importance and usefulness of sensory analysis. The errors in sensory analysis.

Characteristics of a test room and facilities necessary for conducting sensorial tests.

The different types of sensory tests: analytical test versus hedonic tests. Sheets proof for sensory analysis. Statistical treatment of data.

The panels: criteria for selection and training of assessors.

Organoleptic characteristics of olive oil:

The positive characteristics (attributes) and defects of the olive oils and their relationship with technology. The terminology used in olive oil sensory analysis.

Organoleptic characteristics of olives and other products (olive pates): the positive characteristics and defects and the relationship with technology. The terminology used in olives sensory analysis.



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agricultural Effluent Technology (ERU10128)

General introduction to the issue of treatment of wastewater.

Legislation

The olive oil production and its wastewater

General understanding of the biochemical processes of degradation of the main components of the wastewaters

Pollution potential of wastewaters

Evaluation of volumes and polluting potential

Methods to reduce the volumes and polluting charge

Systems for collection and treatment of wastewaters and added value.

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Marketing for olive oil products (GES10131)

1. The commercialization and marketing global context

1.1. Trade and marketing

1.2. The marketing concept and its evolution

1.3. The olive oil marketing environment

1.4. The marketing system

1.5. Associative cooperation and intersectorial cooperation

1.6. e-agro-food marketing

2. The olive oil market

2.1. Characteristics, Organizational Forms and Operation

2.2. Methods of analysis, evaluation and market prevision

2.3. The international market context

2.4. Market research

3. Marketing strategy, plan and control

3.1. Analysis diagnostic

3.2. Marketing objectives

3.3. Marketing strategy

3.4. Olive Oil Marketing-mix

3.5. The Marketing plan

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Olive Tree Morphology and Physiology (BIO10130)

1. External Morphology of the Olive Tree

1.1. The Root

1.2. The Stem

2. The Anatomy and Histology of the Olive Tree

2.1. Plant cell: main characteristics

2.1.1. Cell growth and the primary and secondary cell walls

2.1.2. The diverse types of plant tissues

2.2. The development the olive tree: from seed to mature tree (primary and secondary growth)

2.3. Histology and Anatomy of plant organs : root; stalk; leaves; flower; fruit

3. Physiology of the olive tree : The Water Relations (absorption, transport and transpiration); The Mineral Nutrition; The Balance of Carbon (photosynthesis and respiration) and the distribution of assimilates; The Control of Development (hormones, tropisms, photoperiodism, thermoperiodism and vernalization).

4 The phenological cycle of the olive tree; Flowering, pollination and fertilization; The development, maturation and abscission of fruits

5. Response of olive trees to various types of stress: drought, salinity, temperature, waterlogging



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Olive Grove Planting (FIT10132)

Olive orchard project.

Elaboration of soil capacity maps with GIS.

Climate, soils and orographic factors for conditioning of site selection.

Process for installation of an Olive orchard.

Fertility of soil and Olive orchard fertilization

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Olive Grove Growing (FIT10133)

1- fruit set bearing in olive tree and vegetative growth

2- The different training systems in use

3- Plant density and canopy management

4- Importance of pruning in olives to

5- Mechanical pruning

6- Visit to Hight density olive orchard

7- Visit to superintensive Orchard

8 – Visit to traditional Orchard

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Soil Mantainance in olive grooves (ERU10134)

1. Soil tillage in olive orchards.

1.1 Impact on the mineral fraction and organic matter.

1.2 Impact on water and soil atmosphere.

2 Weeds in the olive orchards

2.1 Identification and characterization of the dominant species

2.2 Strategies for the control of weeds

2.2.1 Physical

2.2.2 Chemical

2.2.3 Genetic

2.3.Machinery

3 The maintenance techniques of soil and its consequences on soil characteristics and in the yield of the olive orchard

3.1 Total Mobilization Vs Herbicide control

3.1 Permanent vegetation cover or temporary

3.3 Mixed Techniques

3.4 Maintenance of soil

3.5 Comparative analysis of different systems, taking into account economic aspects, the conservation of soil and water and equipment trafficability

4 Specifications of the equipment used

4.1 Need for power

4.2 Workable Days

4.3 Fixed costs, variable costs and indirect

4.4 Own equipment and contractors.



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Olive groove fertilisation and irrigation (ERU10135)

Fertigation of olive trees and orchard:

Drip irrigation system - principles and design

Soil samples collection in the field

Irrigation water sampling and analysis for quality and nutrients

Analysis interpretation and conclusions

The olive root system

Olive growth, development and functions

Fertilization to install a new orchard

Leaf analysis for nutrients

Leaf sampling for nutrients and interpretation of results

Fertigation

Practical problems around fertigation of olive trees

Irrigation of olive trees and orchard:

The soil system; soil sampling for physical and chemical analysis

Soil water content; Soil water potential and units

Soil water storage and relative extractable water

Evapotranspiration, transpiration and soil evaporation

Crop water use - traditional, intensive and superintensive orchard

Irrigation scheduling - stomatal conductance and leaf water potential

Soil water potential and water movement in the soil

Deficit irrigation, sustained deficit irrigation, full irrigation

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Integrated Protection of Olive Grove II (FIT10136)

1. Olive Pests

3.1. Olive moth (*Prays oleae*)

3.2 Olive leaf moth (*Palpita vitrealis*)

3.4. Olive thrips (*Liothrips oleae*)

3.6 Olive psyllid (*Euphyllura olivina*)

2. Olive Diseases

4.1. Abiotic diseases

4.2. Olive knot (*Pseudomonas savastanoi* pv *savastanoi*)

4.3 Peacock spot/olive leaf spot (*Cycloconium oleaginum*)

4.4. Verticillium (*Verticillium dahliae*)

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Research Seminar in Olive Growing and Olive Oil (FIT10137)

This curricular unit was created to allow students having a support on the elaboration of their master thesis during the 2nd year of the Master in Olive and Olive Oil Production.

Tutorial sections include:

- debates on subjects which can be used to prepare a master thesis and on its organization and contents;
- presentation of the thesis evolution along the year if possible with the presence of the student adviser.
- special sections with invited speakers.