



Study Plan

School: School of Sciences and Technology
Degree: Master
Course: Olive Cultivation and Olive oil (cód. 752)

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
FIT10123M	Olive Plant Material and Breeding	Agronomy	3	Semester	78
FIT12485M	Integrated Crop Protection of Olive Orchard I	Agronomy	6	Semester	156
ERU10125M	Olive Harvesting and Related Logistics	Rural Engineering	3	Semester	78
FIT13917M	Oil Millers and Olive Oil Technology	Agricultural and Food Engineering	6	Semester	156
FIT13918M	Table Olives Technology	Agricultural and Food Engineering	6	Semester	156
FIT13801M	Olive Oil Sensory Analysis	Agricultural and Food Engineering	3	Semester	78
ERU13896M	Olive and Olive Oil Mill Effluents Technology	Rural Engineering	3	Semester	78

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
GES10131M	Olive Oil Commercialization and Marketing	Management	3	Semester	78
BIO10130M	Olive Tree Phisiology and Morphology	Biological Sciences	6	Semester	156
FIT10132M	Olive Orchard Planning and Planting	Agronomy	6	Semester	156
FIT10133M	Olive Orchard Pruning and Training	Agronomy	3	Semester	78
ERU10134M	Olive Orchard Soil Management	Rural Engineering	3	Semester	78
ERU10135M	Olive Orchard Fertilization and Irrigation	Rural Engineering	6	Semester	156
FIT10136M	Integrated Crop Protection of Olive Orchard II	Agronomy	3	Semester	78

2nd Year - 3rd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
FIT13802M	Olive and Olive Oil Research Seminars	Agronomy Agricultural and Food Engineering	6	Year	156
Dissertation					
Internship					
Project Work					

2nd Year - 4th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
Dissertation					
Internship					



2nd Year - 4th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
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:

1^o Ano{\}\newline

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1^o Semestre:

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

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2^o Semestre:

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7 UC obrigatória num total de 30 Ects

2.^o Ano{\}\newline

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3^o Semestre:

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1 UC obrigatória num total de 6Ects{\}\newline

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Para obtenção do grau, é necessário também a aprovação em Dissertação no total de 54 ECTS, no 3.^o e 4.^o Semestre. ***

Program Contents

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Olive Plant Material and Breeding (FIT10123M)

- 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 Crop Protection of Olive Orchard I (FIT12485M)

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 Related Logistics (ERU10125M)

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 (FIT13917M)

Module 1 – Mill evolution across time.
Module 2 – olive and olive oil composition.
Module 3 – Optimal moment for harvest. Harvest and olive transport. Fruit reception and selection. Preliminary operations and extraction process. Package.
Module 4 – Olive transport. Storage of packed olive oil.
Module 5 – Visits to mill industries.
Module 6 – Olive oil benefits for human health. The olive oil role in Mediterranean diet context.
Module 7 – Curricular unity contribution to United Nation sustainable development goals.
Module 8 – Mill industrial projects.

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Table Olives Technology (FIT13918M)

- 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).
- 7 - Curricular unity contribution to United Nation sustainable development goals.



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Olive Oil Sensory Analysis (FIT13801M)

General considerations:

The senses in sensory analysis. The physiology of the senses. The aroma, taste and texture 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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Olive and Olive Oil Mill Effluents Technology (ERU13896M)

1. Introduction to waste management in the agrifood sector. Nomenclature. Regulation.

2. The olive oil row. Olive grove, mill and canning industry.

3. Notions of Circular Economy. Circular Alentejo Project

4. Review of processes for obtaining olive oil

5. Residues from mills.

6. Biochemistry of the degradation of mill residues.

7. Effluent treatment systems and storage structures.

8. Valorization of the mill's effluents

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Olive Oil Commercialization and Marketing (GES10131M)

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 Physiology and Morphology (BIO10130M)

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 Orchard Planning and Planting (FIT10132M)

1. Projecto for Olive Grove.
2. Preparation of Land Use Capacity Maps.
3. Climate factors conditioning the location. Abiotic factors.
4. Orographic factors conditioning the location. Example of the Alentejo. Main factors of the terrain orography. Relationship with the characteristics of the terrain and implications. The factors in the interpretative classifications of soil and land.
5. Soil factors conditioning the location. Physical Properties of the Soil and their Limitations. Chemical Properties of the Soil and the performance of the Olive Grove.
6. Installation of an olive grove. Design and organization. Site preparation. Modification of the soil profile. Drainage design.
7. The Olive Grove soil fertility. Soil Fertility and the need for Correction. Calculation and Application of Organic and Mineral Correctives.
8. Conservation Agriculture at the Olive Grove. Implementation of Conservation Agriculture. The cover crops at the Olive Grove installation.

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Olive Orchard Pruning and Training (FIT10133M)

- 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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Olive Orchard Soil Management (ERU10134M)

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 Orchard Fertilization and Irrigation (ERU10135M)

Fertilization Module:

- Soil analysis. 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

Irrigation module:

- Drip irrigation system – principles and working characteristics
- The soil system. Soil water content – methods and sampling
- Soil water retention – soil water potential and units
- Available soil water – soil water storage and relative extractable water
- Soil water balance – evapotranspiration, transpiration and soil evaporation
- Crop water use – traditional, intensive and superintensive orchards
- Irrigation scheduling – stomatal conductance and leaf water potential
- State of the art in the irrigation of olive trees – deficit irrigation, controlled deficit irrigation, full irrigation



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Integrated Crop Protection of Olive Orchard II (FIT10136M)

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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Olive and Olive Oil Research Seminars (FIT13802M)

This curricular unit was created to support the students 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.