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
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
FIT10126M	Olive Oil Technology and Facilities	Food Engineering	6	Semester	156
FIT10127M	Table Olives Technology	Food Engineering	6	Semester	156
FIT10129M	Olive Oil Sensory Analysis	Food Engineering	3	Semester	78
ERU10128M	Olive and Olive Oil Mill Effluents Technology	Biosystems 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
FIT10137M	Olive and Olive Oil Research Seminars	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

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1º Semestre:{\}newline

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

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2º Semestre:{\}newline

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

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3º Semestre:{\}newline

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

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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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Olive Oil Technology and Facilities (FIT10126M)

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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Table Olives Technology (FIT10127M)

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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Olive Oil Sensory Analysis (FIT10129M)

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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Olive and Olive Oil Mill Effluents Technology (ERU10128M)

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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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 Phisiology 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 vernelization).
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. Verticilium (Verticillium dahliae)

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Olive and Olive Oil Research Seminars (FIT10137M)

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.