

Course Unit	Production of aromatic and medicinal plants	Field of study	Pharmaceutical Sciences
Master in	Natural Products and Bioprospecting	School	School of Agriculture
Academic Year	2023/2024	Year of study	1
Type	Semestral	Semester	1
Level	2-1	ECTS credits	6.0
Code	5012-740-1103-00-23		
Workload (hours)	162	Contact hours	T 30 TP - PL 6 TC 20 S 4 E - OT 4 O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Manuel Ângelo Rosa Rodrigues

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

- To master the cultural practices of the herbs, trees and shrubs grown as medicinal and aromatic plants, such as seeding, planting, pruning, soil management, fertilization, crop protection, etc.
- To understand the structure, morphology and the life cycle of herbs, trees and shrubs which have interest in phytopharmacy
- To know the agroecological requirements of herbs, tree and shrub species which have interest in phytopharmacy
- To search for alternatives to the conventional crops or new uses for the current crops, such as raw-materials for biofuels, fibers, etc.
- Capacity to implement the best management practices in order to reduce environmental impacts.
- To identify gaps in knowledge and apply for site-specific experimental work.
- To discuss the international issue of wild harvesting versus cultivation and its ecological, economic and social implications.
- To integrate the cultivation of medicinal and aromatic plants in sustainable agricultural systems such as organic farming, biodynamic farming, . . . .

### Prerequisites

Before the course unit the learner is expected to be able to:

- General knowledge on botany
- General knowledge on plant physiology
- General knowledge on soils and soil fertility

### Course contents

Production of aromatic and medicinal plants shrubs and trees (hops, lemongrass, mint, verbena, rosemary, lavender, jasmine, medicinal cannabis, strawberry tree, elderberry, cherry, olive, . . . ). Production of plants intended for non-food purposes such as biomass, biodiesel, bioethanol or textiles. Botanical aspects, cultural and ecological requirements. Vegetative cycle, phenology and development, cultural and sustainable production techniques.

### Course contents (extended version)

- Herbs, trees and shrubs which have interest to phytopharmacy
  - Definitions and concepts
  - Structure and morphology
  - Growth cycle
  - Floral biology, flowering, pollination and fertilisation
  - Plant breeding in herbs, tree and shrub species
  - Cropping techniques (seeding, plantation, irrigation, pruning, fertilisation, crop protection).
- Energy crops for biodiesel, bio-ethanol and biomass production and natural fibers
  - Political framework, economic and environmental
  - National ecological potential for bioenergy production and other non-food crops
  - Agro-ecological adaptation
- Sustainability of agroecosystems
  - Environmental impacts associated with agricultural activity. Alternative farming systems.
  - The agri-environmental policies in the herbaceous sector
- Wild-harvesting versus cultivation of medicinal and aromatic plants.

### Recommended reading

- González, A. R. ; Román, V. L. ; Castro, M. 2009. Plantas Medicinais do Norte de Portugal e Galiza. Mel Editores.
- Mathe, A. 2015. Medicinal and Aromatic Plants of the World: Scientific, Production, Commercial and Utilization Aspects. Springer, The Netherlands.
- Ubillos, M. A. M. ; Montalbán, J. M. 2009. Plants aromáticas gastronómicas. Mundi-Prensa, Madrid.
- Simmonds, M.; HoWes, M.-J.; Irving, J. 2017. The Gardener's Companion to Medicinal Plants: An A-Z of Healing Plants and Home Remedies. Royal Botanic Gardens Kew
- Jackson, D. , Looney, N. , Morley-Bunker, M. , Thiele, G. 2011. Temperate and subtropical fruit production. 3rd Ed. , Cambridge Univ. Press, UK.

### Teaching and learning methods

Introduction of theoretical contents by using audio-visual equipment and blackboard. Establishment of field experiments. Plant material sampling and processing. Seminar preparation, from experimental results and bibliographical searching. Results presentation as written reports and oral communications. Technical study visits.

### Assessment methods

- Alternative 1 - (Regular, Student Worker) (Final)
  - Final Written Exam - 50% (Written exam of the theoretical component)
  - Practical Work - 50% (Experimental studies and reports carried out in class or test replacement for worker-students.)
- Alternative 2 - (Regular, Student Worker) (Supplementary)
  - Final Written Exam - 50% (Written exam of the theoretical component)
  - Practical Work - 50% (Experimental studies and reports carried out in class or test replacement for worker-students.)
- Alternative 3 (worker-students) - (Student Worker) (Special)
  - Final Written Exam - 50% (Written exam of the theoretical component)
  - Practical Work - 50% (Experimental studies and reports carried out in class or a substitution test.)
- Alternative 4 (finalist students) - (Regular, Student Worker) (Special)
  - Final Written Exam - 50% (Written exam of the theoretical component)
  - Practical Work - 50% (Experimental studies and reports carried out in class or a substitution test.)

**Language of instruction**

Portuguese, with additional English support for foreign students.

**Electronic validation**

Manuel Ângelo Rosa Rodrigues	Álvaro José Lopes César	Maria João Almeida Coelho Sousa	José Carlos Batista Couto Barbosa
25-01-2024	01-02-2024	01-02-2024	01-02-2024