



Universitat de Lleida

DEGREE CURRICULUM

# **SPECIAL TOPICS IN ECOLOGY**

Coordination: SERRANO ENDOLZ, LUIS

Academic year 2023-24

**Subject's general information**

<b>Subject name</b>	SPECIAL TOPICS IN ECOLOGY			
<b>Code</b>	11387			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION / 2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Erasmus Mundus Master's Programme in Mediterranean Forestry and Natural Resources Management (MEDFOR)	1	OPTIONAL	Attendance-based
<b>Course number of credits (ECTS)</b>	3			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	PRAULA	TEORIA
	<b>Number of credits</b>	0.5	0.5	2
	<b>Number of groups</b>	2	2	1
<b>Coordination</b>	SERRANO ENDOLZ, LUIS			
<b>Department</b>	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
SERRANO ENDOLZ, LUIS	luis.serrano@udl.cat	3	

## Learning objectives

This course covers different topics related to Ecology, Ecophysiology and Structure and Function of Trees. The contents are adapted to the previous knowledge and particular interests of the students.

The main objective of the course is to understand the behavior of forest tree species and their responses to changes in the environmental factors that operate in Mediterranean ecosystems. Both natural and anthropic commercial forests are studied.

## Competences

In Mediterranean communities, trees are submitted to multiple stresses that alter the growth and survival of most representative species. **Students in this course will acquire skills to determine the drivers that may modify the structure and function of forested areas.** Topics covered are:

The carbon fluxes in the different types of forest ecosystems and the effects of harvest removals, losses and disturbances on carbon sequestration dynamics.

The optimal biomechanics in woody stems and stress distribution.

The ecological wood anatomy related to xylem structure and the water supply function: Safety vs. vulnerability and cavitation as well as wood hydraulic conductance.

Adaptations to drought to maintain turgor: Osmoregulation and changes in tissue elasticity.

Photosynthesis and radiation: Light and photoinhibition responses: Protection by xanthophyll cycle.

Water use efficiency and tree growth.

Ice formation in plants and adaptations to frost events.

## Subject contents

Introduction to the course:

- Carbon balance of forest systems and biomass production.
- Effects of environmental factors in tree growth.
- Effects of cultural practices in stem shape and timber quality.
- Biomechanics and growth strategies.
- Plant water relations.
- Stress Ecophysiology. Drought, radiation and extreme temperatures stresses.

Laboratory and field work:

- Analysis and preparation of microscope section of primary and secondary xylem.
- Water potential measurement with a pressure chamber.
- Gas exchange parameters measured with an IRGA
- Freezing point detection in plant tissues: thermal analysis with thermocouples.
- Quantum yield efficiency of photosystem II determined with chlorophyll fluorescence.

## Methodology

The teaching methodology of this course consists of a Tutorial Work conducted in small groups. There is the possibility, upon request and only for interested students, to follow the course as an Individual Study. Regardless of the type of course chosen, the classes will be agreed and scheduled with the students in order to discuss specific contents, attend lectures and laboratory sessions, analyze progress and provide new study material.

## Evaluation

For the course evaluation Students should prepare reports of the main issues addressed in classes and in the reading assignments (articles/books), including the most innovative ideas, hypothesis, results and a short discussion.

## Bibliography

- Dickinson, W. C. (2000). Integrative Plant Anatomy. Academic Press.
- Herrel, A., Speck, T. & Rowe, N. P. (Eds). (2006). Ecology and Biomechanics. CRC Press.
- Kozlowski, T. T., Kramer, P. J. & Pallardy, S. G. (1991). The Physiological Ecology of Woody Plants. Academic Press.
- Lambers, H., Chapin III, F. S. & Pons, T. L. (1998). Plant Physiological Ecology. Springer.
- Landsberg, J. J. & Gower, S. T. (1997). Applications of Physiological Ecology to Forest Management. Academic Press.
- Larcher, W. (2003). Physiological plant ecology. Springer
- Salisbury, F.B. & Ross, C.W. (1991). Plant Physiology. Wadsworth Publishing Company
- Schweingruber, F. H. (2007). Wood Structure and Environment. Springer.