



Universitat de Lleida

DEGREE CURRICULUM  
**ST IN MOLECULAR FOREST  
ECOLOGY: FROM GENES TO  
MANAGEMENT**

Coordination: OLIVA PALAU, JONAS

Academic year 2023-24

## Subject's general information

<b>Subject name</b>	ST IN MOLECULAR FOREST ECOLOGY: FROM GENES TO MANAGEMENT			
<b>Code</b>	111021			
<b>Semester</b>	ANUAL CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Master's Degree Erasmus Mundus in Spatial and Ecological Modelling in European Forestry	2	OPTIONAL	Attendance-based
	Master's Degree Erasmus Mundus in Spatial and Ecological Modelling in European Forestry		OPTIONAL	Attendance-based
<b>Course number of credits (ECTS)</b>	3			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	TEORIA		
	<b>Number of credits</b>	3		
	<b>Number of groups</b>	1		
<b>Coordination</b>	OLIVA PALAU, JONAS			
<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.			
<b>Language</b>	English			
<b>Distribution of credits</b>	Total: 3			
	Theoretical: 60% Practical: 40%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
OLIVA PALAU, JONAS	jonas.oliva@udl.cat	3	

## Learning objectives

Molecular tools have emerged as a novel source of information in fields like medicine and conservation biology. In forestry, molecular tools increasingly assist managers to take decisions. Thanks to these tools we can understand big ecological questions such as the influence of forest management on carbon cycling and climate change. However, these tools are also gaining terrain on more practical aspects of forest management such as on understanding why some tree species regenerate better under canopies of other species (diversification and mixed forests), or whether a pathogen is exotic or native (forest pathology) or whether supplied planting material corresponds to the right population or clone (silviculture). Molecular tools are also focus of controversy due to the application of them for GMOs. Understanding the array of techniques, their advantages and shortcomings are of utmost importance for foresters of the future.

After the course:

- The student will gain theoretical background to understand the basis of molecular tools.
- The student will also get an overview of the most common techniques used nowadays, and examples where they are applied for practical matters of forest management.

## Competences

Note that no background on molecular biology is needed; this will be provided in the course.

## Subject contents

The course will be organised so in every lecture we will introduce a new technique together with an example where it has been used in forest management. The techniques learned will increase in complexity as the course advances.

- PCR, basics of molecular biology, terminology.
- qPCR, gene expression and quantification.
- Microsatellites: gene-flow and species origin.
- High-throughput sequencing and environmental monitoring.
- Genomes, genome editing and genetically modified organisms.

## Methodology

The course will be based on:

- Lectures based on the latest scientific literature.
- Student presentations on case studies
- Practical experiments with DNA including computer exercises.

- Field trip
- Student presentations of individual reports.

## Development plan

The course will start with lectures and a laboratory practical. Later on, students will present case studies that will be discussed in the class. Half-way in the course, students will be assigned a short individual project on a management plan for an invasive pathogen. Students will weekly update the others with the development of their individual project, that will be presented towards the end of the course. The course will finish with an exam that students will do at home, and then later discuss in class.

## Evaluation

In order to pass the course the student should attend 70% of the lectures, labs, and group discussions. In order to pass, the student will have to:

- Hand in a report of the molecular lab
- Give a presentation of an example where a molecular technique has been used in forest management.
- Hand in a report of the individual project and give a short presentation.

Exam that will be done by students at home on their own.