



Universitat de Lleida

DEGREE CURRICULUM  
**ST IN PRECISION FORESTRY**

Coordination: VEGA GARCIA, CRISTINA

Academic year 2023-24

## Subject's general information

<b>Subject name</b>	ST IN PRECISION FORESTRY			
<b>Code</b>	111005			
<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
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<b>Course number of credits (ECTS)</b>	3			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRACAMP	PRALAB	TEORIA
	<b>Number of credits</b>	0.6	1.2	1.2
	<b>Number of groups</b>	1	1	1
<b>Coordination</b>	VEGA GARCIA, CRISTINA			
<b>Department</b>	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	1 ects is 10h presential activity, 15h independent work			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	English only			
<b>Distribution of credits</b>	40% theory, 60% Practice, 3 ects			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MESTRE RUNGE, CRISTIAN	cristian.mestre@udl.cat	2,8	
VEGA GARCIA, CRISTINA	cristina.vega@udl.cat	,2	

## Subject's extra information

Introductory course to forest inventory and stand structure analysis with high spatial resolution sensors (drones, LiDAR).

A minimum background or previous course on GIS and forest mensuration is necessary to complete the analyses in the computer labs.

## Learning objectives

To analyze and spatialize forest inventory plot and stand structure data for different ecosystem services by using high spatial resolution sensors (drones, LiDAR)

## Competences

Students will be able to apply the theory and practice behind high-resolution sensing technologies and make informed decisions about its possible applications in Forestry.

Students learn the underlying principles of drone and LiDAR data collection, the preparation of point cloud datasets for visualization and use in ArcGIS and in open source software, the statistical analysis of point datasets to derive additional information on forest composition, stand structure and condition, and the integration with field inventory data (plots) to develop spatial predictions of forest stand attributes across landscapes.

## Subject contents

1. Classification and type of precision forestry sensors
2. Managing, understanding, visualizing and storing point cloud data after query and download. Sources of data.
3. Building DEMs and DSMs.
4. Deriving metrics from the point cloud and calculating vegetation characteristics: i.e. tree height or biomass density.
5. Development of footprint-, plot- or stand-scale predictions of forest structure.
6. Applications to forest inventory, wildfire management and wildlife habitat conservation: Study cases.

## Methodology

The classes are organized by the students according to flipped learning strategies with materials provided by the instructors. Study cases are analyzed, individually and jointly, for formative evaluation. Lab exercises are conducted, and field trips allow acquiring field data for validation of models. ArcGIS, FUSION and MS Excel (or R) are used to explore LAS point clouds for inferring forest stand traits (composition and structure), and the spatial modelling of forest inventory metrics.

## Development plan

Scheduling is by agreement with the students at the beginning of the course.

The course will be coordinated with other courses in the same programme.

## Evaluation

Grading is based on the resolution of individual study cases and collaborative work, presentations and other activities (seminars, labs, etc.).

## Bibliography

You can access general materials through the Catalog in our digital library system: <http://www.bib.udl.es/> and particularly the Sakai site of the course, where all required materials are provided.