



Universitat de Lleida

DEGREE CURRICULUM
**MEASUREMENTS AND
CONTROL IN ECOPHYSIOLOGY**

Coordination: COSTA TURA, JOAN

Academic year 2023-24

Subject's general information

Subject name	MEASUREMENTS AND CONTROL IN ECOPHYSIOLOGY				
Code	11380				
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION				
Typology	Degree		Course	Character	Modality
	Erasmus Mundus Master's Programme in Mediterranean Forestry and Natural Resources Management (MEDFOR)		1	OPTIONAL	Attendance-based
Course number of credits (ECTS)	3				
Type of activity, credits, and groups	Activity type	PRACAMP	PRALAB	PRAULA	TEORIA
	Number of credits	0.4	1.3	0.5	0.8
	Number of groups	1	1	1	1
Coordination	COSTA TURA, JOAN				
Department	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING				
Important information on data processing	Consult this link for more information.				
Language	English				

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
COSTA TURA, JOAN	joan.costatura@udl.cat	2	
LAMPURLANES CASTEL, JORGE	jorge.lampurlanes@udl.cat	,8	
PLAZA BONILLA, DANIEL	daniel.plaza@udl.cat	,2	

Learning objectives

•In general:

–To expand knowledge and acquire practice in the management of the main instruments used in studies of environmental physiology in forest plants.

•Specific:

–To know the theoretical bases that applies to measurement and control.

–To understand how instrumentation and control techniques work.

–To update knowledge and discuss applications about present state of electronic instrumentation/sensors, data acquisition/transfer and control systems in forestry on selected examples.

Subject contents

• Introduction.

- Presentation. Objectives.
- Organization. Assessment.

• Measures in the air: Basic sensors.

- Temperature
- Humidity
- Rain gauge
- Pressure
- Flow
- Radiation

• Automation, data collection and control systems

- Electronic bases

- Acquisition of data: sensors and data loggers
- Data transfer
- Control systems

•Measures in the soil

- Root system
- Content and water potential
- Infiltration
- Moisture retention curves
- Hydraulic conductivity

• Measures with the plant

- Radiation interception by canopy
- LAI
- Water stress
- Net photosynthetic rate (CO_2 and water vapour balance) and transpiration

Evaluation

Course requirements include the presentation of:

1. Several practical class exercises about: "Measures in the air: Basic sensors", "Automation, data collection and control systems" and "Measures with the plant" (20%)
2. Several practical class exercises about: "Measures in the soil": 15 %
3. An individual Final Class Project (50%)
4. And a final theory exam (15%)

A minimum of 4/10 is required in each Block in order to pass the course

Pd. The final theory exam can be totally or partially replaced by the practical class exercises and the Final Class Project. Then the final Class Project will be 65 %.

Alternative assessment:

Final Theory/practice exam

Individual Class Project

A minimum of 4/10 is required in each part in order to pass the course

Bibliography

- "Manuals of the devices that are used ": READ THEM!!
- Manuals of electronics/control and similar:

Bolton, W. (1999). Instrumentación y control industrial (2 ed.). Editorial Paraninfo, Madrid. 279 pgs. Industrial control and instrumentation. Universities Press. India.

Hewlett Packard (1983). Application Note 290: Practical temperature measurements. Hewlett Packard, USA. 27 pgs.

Cox, S. W. R. (1997). Measurement and control in agriculture. Blackwell Science Ltd, Oxford. 271 pgs.

McMillan, G. K and Considine, D. M. (editors) (1999). Process/industrial instruments and controls handbook (5 ed.). McGraw-Hill, New York.

Potter, D. (1996). Measuring temperature with thermistors - a tutorial. Application Note 065. National Instruments, USA. 8 pgs.

•Basic Books on measures in environmental physiology

Jones, H. G. (2013 3rd Ed.). Plants and microclimate. Cambridge University Press. 423 pg.

Pearcy, R. W., Ehleringer J., Mooney H. A. and Rundel, P. W. (1989). Plant physiological ecology. Field methods and instrumentation. Chapman & Hall. 457 pg.