



Universitat de Lleida

DEGREE CURRICULUM
**ST IN MULTI-SCALE FOREST
DYNAMICS MODELS**

Coordination: COLL MIR, LLUIS

Academic year 2019-20

Subject's general information

Subject name	ST IN MULTI-SCALE FOREST DYNAMICS MODELS			
Code	111006			
Semester	ANUAL CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Master's Degree Erasmus Mundus in Spatial and Ecological Modelling in European Forestry	2	COMPULSORY	Attendance-based
Course number of credits (ECTS)	5			
Type of activity, credits, and groups	Activity type	PRACAMP	PRALAB	TEORIA
	Number of credits	1.5	1.5	2
	Number of groups	1	1	1
Coordination	COLL MIR, LLUIS			
Department	CROP AND FORESTRY SCIENCES			

Teaching staff

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
AMÉZTEGUI GONZÁLEZ, AITOR	aitor.ameztegui@eagrof.udl.cat	2,1	
COLL MIR, LLUIS	lcoll@eagrof.udl.cat	0	
DE MIGUEL MAGAÑA, SERGIO	sergio.demiguel@pvcf.udl.cat	,4	
PROFESSOR PENDENT ASSIGNAR		2,5	

Learning objectives

The course aims at introducing the students into the main approaches used to simulate forest dynamics at several spatial scales. It will provide some general modeling principles and information on the main trends in modeling forest dynamics in Europe. At the end of the course, the students will know: (1) the advantages and disadvantages of the different forest modeling approaches, (2) the main applications of some of the most widespread models of forest dynamics used in Europe and (3) how to use them.

Significant competences

After taking this course, the students will have learned:

- The principles that must underlie in any model of forest dynamics
- The applications of models of forest dynamics, and the current trends in forest modelling in Europe.
- The main types of models, their advantages and limitations
- How to use forest models to solve forestry and ecology problems

How to use, in a practical way, some of the most widespread models of forest dynamics

Subject contents

1. Introduction. Principles of modelling of forest dynamics.
2. Current trends and needs in modelling forest dynamics. Definition of scenarios.
3. Types of models according to their functioning: empirical, process-based and hybrid models.
4. Types of models according to their scale. Individual-based models, gap models, landscape models, and dynamic global vegetation models
5. Growth and yield models. Principles, examples and applications.
6. Process-based models: 3-PG, GOTILWA, medfate
7. Individual-based/gap models: JABOWA, FORET, ForClim, SORTIE-ND
8. Landscape models: LandClim, medfire, Landis Pro.

9. Dynamic global vegetation models.

Methodology

The course will be based on lectures and conferences by some of the developers of the presented models. The students will also have the chance to do practical exercises using some of the models. In some of the Units, the students will also read some recommended readings, which will be discussed later in class.

Development plan

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

Evaluation

Grading will be based on (i) participation on lectures and debates, and (ii) completion of practical exercises

Bibliography

(Additional literature will be supplied during the course)

- Bugmann, H 2001. A review of forest gap models. *Climatic Change* 51(3-4): 259-305.
- Kimmins, H; Blanco, JA; Seely, B; Welham, C; Scoullar, K. 2010. *Forecasting Forest Futures: A Hybrid Modelling Approach to the Assessment of Sustainability of Forest Ecosystems and their Values*. The Earthscan Forest Library. Vancouver, Canada.
- Larocque, GR; Shugart, HH, Xi, Weimin; Holm, JA. 2015. Forest succession models. In: Larocque, G (ed) *Ecological Forest Management Handbook*. CRC Press. Ottawa, Canada.
- Larocque, GR; Komarov, A; Chertov, O; Shanin V; Liu, J; Bhatti, JS; Wang, W; Oeng, C; Shugart HH; Xi, W; Holm JA. 2015. Process-based models, a synthesis of models and applications to address environmental and management issues. In: Larocque, G (ed) *Ecological Forest Management Handbook*. CRC Press. Ottawa, Canada.
- Schneider, R; Franceschini, T; Fortin, M; Martin-Ducup, O; Gauthray-Guyénet, V; Larocque, GR; Marshall, P; Bérubé-Deschênes, A. 2015. Growth and Yield models for predicting tree and stand productivity. In: Larocque, G (ed) *Ecological Forest Management Handbook*. CRC Press. Ottawa, Canada.
- Taylor, A.R., Chen, H.Y.H., VanDamme, L., 2009. A review of forest succession models and their suitability for forest management planning. *Forest Science* 55, 23–36.