GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2021-2022

Vegetation Modelling (I002696)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0 **Study time 120 h** **Contact hrs** 40.0 h

Course offerings and teaching methods in academic year 2021-2022

A (semester 2)	English	Gent	microteaching	2.5 h
			seminar: practical PC room classes	11.25 h
			lecture	25.0 h
			group work	1.25 h

Lecturers in academic year 2021-2022

Verbeeck, Hans	LA20	lecturer-in-charge

Offered in the following programmes in 2021-2022	**crdts**	**offering**
Master of Science in Bioscience Engineering: Forest and Nature Management	4	A
Exchange Programme in Bioscience Engineering: Land and Forest management (master's level)	4	A

Teaching languages

English

Keywords

Vegetation models, ecological forecasting, upscaling

Position of the course

In the current Antropocene era vegetation is influenced by fast changing conditions worldwide. In this context, there is a large need for scientific information on the future response of forest and nature to these global changes. Vegetation models are important tools to address this demand. In this course vegetation models will be studied in detail as a tool for knowledge synthesis, upscaling, data-integration and forecasting. Multiple key processes are discussed and applied in practical simulation excercises with existing vegetation models at multiple scale levels. Attention is given to the use of vegetation models for research, policy support and ecosystem management.

Contents

Theory

Introduction

1.Vegetation modelling: conceptual framework, upscaling, model structure, model development

Biophysical and physiological models

2. Modelling plant basic processes
3. Modelling radiation transfer and canopy representation
4. Modelling temporal and seasonal dynamics (phenology)

Modelling vegetation dynamics

5. Modelling allocation and biogeochemical cycles
6. Modelling demography and vegetation dynamics
7. Representing diversity in vegetation models

Upscaling and applications

8. Spatial heterogeneity, landscape scale and disturbance
9. Upscaling from leaf to globe
10. Projections and scenario analysis

Exercises:

simulation exercises with vegetation models touching upon multiple methodological aspects (initialisation, optimalisation, sensitivity, uncertainty)

Initial competences

This course builds on certain learning outcomes of the courses 'wetenschappelijk promrammeren', 'ecologie', 'modelleren en simuleren van biosystemen', of the eindcompetenties warden op een andere manier verworven.

Final competences

1 Identifty the different types of vegetation models
2 Understand the structure of process-based vegetation models
3 Explain key processes needed to simulate the response of vegetation to a chaging environment
4 Perform simulation with existing vegetation models
5 Interpret and process vegetation model outputs
6 Appreciate the strength and weaknesses of vegetation models and their associated uncertainties

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, lecture, microteaching, seminar: practical PC room classes

Learning materials and price

Lecture handouts and syllabus provided via Ufora

References

Climate Change and Terrestrial Ecosystem Modeling, Gordon Bonan, Cambridge University Press | 2019 | 437 pages
Ecological Forecasting, MC Dietze, Princeton University Press, 2017

Physiological Ecology of Forest Production: principles, processes and models, Landsberg J & Sands P, Academic Press.

Course content-related study coaching

Individual coaching is possible, including interactive via Ufora

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Oral examination, skills test

Examination methods in case of periodic evaluation during the second examination period

Oral examination, skills test

Examination methods in case of permanent evaluation

Participation, assignment, simulation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Calculation of the examination mark

60 % exam (oral on theory and skilltest), 40% on non periodic evaluation (report, simulations, participation)