GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Ecological Modelling (C003325)

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

Credits 7.0 **Study time 210 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Gent	lecture
			seminar

Lecturers in academic year 2024-2025

Bonte, Dries	WE11	lecturer-in-charge
Soetaert, Karline	WE11	co-lecturer

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Biology)	7	A
Master of Science in Biology	7	A
Exchange Programme in Biology (master's level)	7	A

Teaching languages

English

Keywords

Modelling philosophy, Model formulation, parameterization and solution, sensitivity analyses, Analytical and Numerical methods, ecological and evolutionary dynamics

Position of the course

Modelling in ecology and evolution becomes increasingly important to understand and predict complex dynamics of populations. Yet, students are often unfamiliar with the different modeling approaches. This course aimes at providing an overview of the most-used modeling techniques in ecology and evolution and to give skills for constructing and using simple ecological models. Students learn modelling in R and Python.

Contents

Introduction to Scientific Computing in R
Model construction: model development, solution, application and analysis
Modelling approaches in ecology and evolution: equilibria and stability in discrete and continuous time models; Optimisation methods, Game theory, stage-structured models, Individual based simulations

Project development in Python

Initial competences

Principles of population ecology and evolution, mathematical methods, computational techniques

Final competences

1 Developing awareness of the uses and limitations of different modelling approaches for studying ecological and evolutionary processes.
2 Obtaining skills required to construct simple ecological models.
3 Developing and using models to study ecological and evolutionary dynamics.

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

Seminar, Lecture

Study material

Type: Handbook

Name: A Practical Guide to Ecological Modelling
Indicative price: Free or paid by faculty
Optional: no
Language : English
Author : Karline Soetaert - Peter Herman
Online Available : Yes
Available in the Library : Yes
Available through Student Association : No
Usability and Lifetime within the Course Unit : intensive
Usability and Lifetime within the Study Programme : regularly
Usability and Lifetime after the Study Programme : occasionally

References

Roff, D. A. 2010. Modeling Evolution: An Introduction to Numerical Methods. Oxford Univ. Press, Oxford
Soetaert K. & Herman P.M.J. 2009.A Practical Guide to Ecological Modelling.Springer
Kokko, H. 2007. Modelling for field biologists and other interesting people. Cambridge University press

Course content-related study coaching

Assessment moments

end-of-term assessment

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

Written assessment, Assignment

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

Written assessment, Assignment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

report: modelling project

Calculation of the examination mark

80% examination, 20% modelling project and homework