

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 aims 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