Ecological Modelling (C003325)

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

Credits 7.0	Study time 210 h	Contact hrs	74.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	seminar: coached exercises	37.5 h
		seminar: practical PC room classes	6.25 h
		lecture	15.0 h
		lecture: plenary exercises	15.0 h

Lecturers in academic year 2018-2019

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

Offered in the following programmes in 2018-2019

	crdts	offering
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

Lecture, lecture: plenary exercises, seminar: coached exercises, seminar: practical PC room classes

Learning materials and price

Course material delivered by teachers via Minerva

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

Evaluation methods

end-of-term evaluation

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

Written examination, open book examination, assignment

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

Written examination, open book examination, report

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

report: modelling project

Calculation of the examination mark

80% examination, 20% modelling project and homework