

## Ecological Modelling (C003325)

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 7.0 Study time 210 h Contact hrs 74.0 h

### Course offerings and teaching methods in academic year 2020-2021

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

### Lecturers in academic year 2020-2021

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

### Offered in the following programmes in 2020-2021

programme	crdts	offering
<a href="#">Master of Science in Teaching in Science and Technology (main subject Biology)</a>	7	A
<a href="#">Master of Science in Biology</a>	7	A
<a href="#">Exchange Programme in Biology (master's level)</a>	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

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

#### Learning materials and price

Course material delivered by teachers via Ufora

#### 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