

Population Processes (C003625)

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

Credits 6.0

Study time 180 h

Course offerings and teaching methods in academic year 2024-2025

A (semester 1)

Dutch

Gent

lecture

seminar

Lecturers in academic year 2024-2025

Lens, Luc

WE11

lecturer-in-charge

Maere, Steven

WE09

co-lecturer

Offered in the following programmes in 2024-2025

[Bachelor of Science in Mathematics](#)

crdts

6

offering

A

[Master of Science in Bioinformatics\(main subject Systems Biology\)](#)

6

A

Teaching languages

Dutch

Keywords

Population numbers, population growth, demography, interactions, spatial structure, exploitation, evolution of molecular biological systems

Position of the course

Students gain insight into underlying processes that determine the functioning of natural populations within an ecological and evolutionary framework. This is achieved through the study of theoretical models and applied case studies.

Contents

The ecological section of the course consists of the following chapters: estimation of population numbers, population growth, demography, competition, predation, parasitism, spatially-structured populations, exploited populations. Focus is both on the development of theoretical models (e.g. capture-recapture models, growth models, Lotka-Volterra models, SI-model, Incidence Function model, dynamic pool model) and on their use in particular case studies. The evolutionary section comprises the chapters 'Introduction to molecular evolution', 'Evolution of molecular biological systems within a population context', 'Similarities and differences between evolution and optimization of molecular systems', 'Individual-based evolutionary simulation models'

Initial competences

Able to apply simple techniques from infinitesimal analysis

Final competences

- 1 To report on the basic concepts underlying the functioning of natural populations and their genetic evolution in accurate scientific language.
- 2 To explain population-ecological models and assess their applicability.
- 3 To apply population-ecological models in ecological and genetic problem-solving.
- 4 To understand the interface between population ecology and other mathematical disciplines.

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: Syllabus

Name: Population ecology
Indicative price: Free or paid by faculty
Optional: no
Language : Dutch
Number of Pages : 422
Oldest Usable Edition : 2023-24
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

Type: Slides

Name: Population ecology
Indicative price: Free or paid by faculty
Optional: no
Language : Dutch
Number of Slides : 670
Oldest Usable Edition : 2023-24
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

References

Alstad, D.N. 2001. Basic Populus Models of Ecology. Prentice-Hall, Inc. NJ. (ISBN 0-13-021289-X)
Krebs, C.J. 2001. Ecology: the experimental analysis of distribution and abundance (5th Ed). Benjamin Cummings, NY (ISBN 0-321-04289-1)

Course content-related study coaching

During practical classes, population ecological concepts are illustrated with practical examples. During these classes, students can pose general questions on the course's content.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Written assessment

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

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Practicals: written
Theory: oral examination with written preparation. Students are evaluated on their knowledge of population-ecological concepts and insight into ecological modeling.

Calculation of the examination mark

Theory: 1/3
Practicals: 1/3
Project: 1/3