GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Molecular Microbial Ecology (C002724)

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

Credits 3.0 **Study time 80 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Gent	lecture
			excursion
			independent work

Lecturers in academic year 2024-2025

Joossens, Marie	WE10	lecturer-in-charge

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Biochemistry and Biotechnology)	3	A
Master of Science in Bioinformatics(main subject Systems Biology)	3	A
Master of Science in Biochemistry and Biotechnology	3	A
Exchange programme in Biochemistry and Biotechnology (master's level)	3	A

Teaching languages

English

Keywords

Prokaryotes, microbial ecology, molecular biodiversity, microbial population dynamics, metagenomics, diversity and function, gastrointestinal microbiology and its relation to health and disease

Position of the course

The course is scheduled in the major/minor Microbial Biotechnology and builds on the basis provided by the courses General Microbiology (2nd bachelor) and General Microbiology: diversity of prokaryotes, fungi, and yeasts (3rd bachelor).
The discipline 'Molecular Microbial Ecology' stems from the stepwise introduction of molecular biological techniques in microbial ecology. The starting point of this course is the molecular exploration of microbial biodiversity in various natural ecosystems. For specific microbial groups or subpopulations, the relation between diversity, metabolic function and cross-interactions at population level will be discussed.
The purpose of this course is to familiarize students with techniques that allow to investigate the microbial diversity of natural ecosystems at cellular and population level, and to demonstrate the link between this diversity and function for autochthonous micro-organisms in interactions with human, plant, food and aquatic ecosystems. Prokaryotes will be the main focus.

Contents

1. In the first part of the course, the theoretical and practical basis of Molecular Microbial Ecology as research discipline is provided. The following course items are scheduled here: (i) overview and critical evaluation of molecular methods used to study the biodiversity and ecology of micro-organisms in natural habitats; (ii) cell-cell interactions as basic requisite for the development of microbial ecosystems; (iii) the relevance of bacterial isolations for the future of functional genomics and metagenomics: new strategies.
2. In a second part of this course, a number of specific ecosystems will be discussed. The human-associated microbial ecosystems will be the main focus. More specifically, the interactions between the intestinal microbiome, the host and

the host's diet will be discussed in relation to health and disease and will include both fundamental aspects as well as (biomedical) applications among others. In addition, there are guest lectures covering other microbial ecosystems.

Initial competences

Bachelor BB
Basic knowledge microbiology, biochemistry, molecular biology

Final competences

1 The student understands the relation between microbial diversity and function in simple and complex natural ecosystems.
2 The student is familiar with the research tools required to study this relation and can apply them in this area.

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

Excursion, Lecture, Independent work

Extra information on the teaching methods

Independent work involves critical discussion of published molecular analysis techniques coupled with literature review. Each student prepares an individual report for evaluation.
The excursion involves a visit to a company.

Study material

Type: Slides

Name: printed slides for open book exam
Indicative price: € 5
Optional: no
Language : English
Number of Slides : 475
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

Type: Excursion

Name: (public) transport to company
Indicative price: € 5
Optional: yes

References

For each lecture, recent scientific publications will be suggested as non-obligatory literature.

Course content-related study coaching

Students can ask questions during and after each class. Interactive support via Ufora and e-mail. Personal contact with lecturers is possible following electronic appointment.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment

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

Oral 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 in modified form

Extra information on the examination methods

NPE: Report of individual exercise coupled to literature searches
PE: Oral exam with open questions

Calculation of the examination mark

- Individual exercise coupled to literature searches: 15%
- Exam: 85%

During the second examination period, the same points for the individual exercise coupled with literature research are again counted for 15%. Those who abstain from the field trip and/or independent work cannot pass the course unit. A student who is unjustifiably absent or who does not submit the independent work in time will receive an undeliverable final score.