

Microbiomics (I002614)

Cursusomvang *(nominale waarden; effectieve waarden kunnen verschillen per opleiding)*

Studiepunten 4.0 **Studietijd 120 u**

Aanbodsessies en werkvormen in academiejaar 2023-2024

A (semester 1)	Engels	Gent	hoorcollege groepswerk
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Lesgevers in academiejaar 2023-2024

Boon, Nico	LA25	Verantwoordelijk lesgever
Van Herreweghen, Florence	LA25	Medewerker
Rajkovic, Andreja	LA23	Medelesgever

Aangeboden in onderstaande opleidingen in 2023-2024

	stptn	aanbodsessie
Master of Science in Bioscience Engineering: Cell and Gene Biotechnology	4	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: cel- en genbiotechnologie (niveau master-na-bachelor)	4	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: milieutechnologie (niveau master-na-bachelor)	4	A

Onderwijstalen

Engels

Trefwoorden

juxtaposition, SWOT, molecular and related techniques, detection, monitoring, (sub)typing, qualitative and quantitative approach, controls, sample preparation, interpretation, group work

Situering

The course content will reflect on how molecular and related, or complementary, approaches can contribute to increased insights and help solving issues related to specific case studies in bioscience engineering. This will cover a wide variety of applications (environmental bioengineering and plant biotechnology, food safety and (human) health) and matrices (e.g. soils, plants, water, food, the gastrointestinal tract, etc.). At the end of the course, the student will be knowledgeable to judge benefits and drawbacks of a diverse range of molecular and complementary techniques in a given context. The student should be able to select and argue the most appropriate techniques "fit for purpose" with a correct interpretation of results in the framework of a defined research question.

Inhoud

The course will introduce the concept of triangulation for microbial analysis. The course is essentially built as a peer teaching program. After introductory lessons by the professors, students will be grouped and to each group different techniques and cases will be allocated to prepare lectures on these topics. Each group will teach other groups with the supervision of the professors and their associates. The course will introduce the concept of juxtaposition: by means of a number of case studies (research problems) students as lecturer(s) will always select best fitting methodological approaches, molecular tools or alternative methods, that might be used to solve given case/research question.

The purpose of **triangulation is contrast and/or complement** two directly or indirectly related molecular (or alternative and complementary) approaches to each other. SWOT analysis for support in 'fit for purpose' decision making of a particular approach for a defined research problem, will be introduced. Triangulation of molecular (or other alternative) approaches will relate to topics such as:

- 1 Fingerprinting of microbial communities
- 2 (over)interpretation of untargeted analysis versus targeted analysis

- 3 Detection, quantification and characterization of microorganisms and their metabolites and toxins
- 4 Methods: DNA-based, RNA-based, molecule-based, cell-based, culturomics
- 5 The relationship (or not) between phylogeny & activity
- 6 Antibiotic resistance, persistence, virulence
- 7 Definition of pathogenicity of human pathogens
- 8 One-health: (sub)typing & source attribution
- 9 Online monitoring of water quality

Active learning will be stimulated during the course as students (in groups) will prepare and teach lectures while their peers (students from other groups) will be engaged in the discussion. The discussions will be moderated and supported by the professors and their associates. The case studies discussed in the lectures will elaborate molecular approaches for one particular defined application in the area of bio-science engineering, but with generally broader potential for use in many different domains.

Students will need to discuss the 'fitness' of the molecular approach taken and report on this to their peers (students & lecturers), by means of 1) peer teaching, 2) power point presentations and 3) Q&A material.

The study material (slides and Q&A material, as well as additional material such as research and review papers and extracts from books) will mainly serve as a reference book providing information on the principle and pitfalls of the molecular approaches introduced during the case studies. The lectures will be supported by comments provided by professors.

Begincompetenties

basic level of molecular biology, microbiology and biochemistry is required.

Eindcompetenties

- 1 To discuss the strengths, weaknesses, opportunities and threats (SWOT analysis) of the molecular approaches currently available for defined case studies.
- 2 To select the appropriate molecular approach and argument the methodology, including the use of appropriate controls in place, in applied biological sciences
- 3 Reflect critically on various sources of information
- 4 prioritize and summarize acquired knowledge and communicate this knowledge to your peers

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Groepswerk, Hoorcollege, Zelfstandig werk

Toelichtingen bij de didactische werkvormen

During the lectures, several case studies are critically discussed in close interaction with the students to get familiar with the concept of juxtaposition.

During the group work, the students themselves need to select a fit for purpose molecular approach to answer the research question of their case study. They discuss the 'fitness' of the molecular approach taken in order to report (micro-teaching) on this to their peers (students & lecturers).

Guided self-study: feedforward and guidance on progress of group task

During the microteaching, they will present the outcomes of their group work and discuss this with their peers.

Leermateriaal

Presentations of the lectures and the microteaching will be available through UFORA. UFORA will contain lots of supporting information for this course.

Referenties

Vakinhoudelijke studiebegeleiding

Coaching is available before or after lectures and on fixed moments for the task assignment (group work). The lecturers and assistants can also be contacted by mail.

Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijke evaluatie

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijke evaluatie

Evaluatievormen bij niet-periodegebonden evaluatie

Participatie, Presentatie, Peer en/of self assessment, Werkstuk

Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is niet mogelijk

Toelichtingen bij de evaluatievormen

The course content of the lectures and microteaching is evaluated by means of a written exam. The group work is evaluated by means of the presentation and discussion (microteaching), the assignment (slides) and peer-evaluation of the group members. Participation of the students during all the microteachings is also mandatory and is taken into account for the evaluation (presence, questions, interactions...).

Eindscoreberekening

The examination accounts for 60% of the evaluation, while the peer teaching and non-periodic assessment account for 40% of the evaluation.

IMPORTANT:

For calculation of the final score the student must gain a minimum score of 8/20 for the period-bound exam. Essential competences are evaluated on the exam day.

If the student passes the period-bound exam, credits from the peer teaching and non-periodic assessments will be incorporated for calculation of the final credit

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.