GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Plant Biotechnology (I002611)

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

Credits 5.0 **Study time 150 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Gent	practical
			peer teaching
			group work
			seminar
			lecture

Lecturers in academic year 2024-2025

Bauters, Lander	LA25	staff member
Pauwels, Laurens	LA25	lecturer-in-charge

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Bioinformatics(main subject Bioscience Engineering)	5	A
International Master of Science in Agro- and Environmental Nematology	5	A
Master of Science in Biochemical Engineering Technology	5	A
Master of Science in Bioscience Engineering: Cell and Gene Biotechnology	5	A
Exchange Programme in Bioinformatics (master's level)	5	A
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)	5	A
Exchange Programme in Bioscience Engineering: Cell and Gene Biotechnology (master's level)	5	A

Teaching languages

English

Keywords

Plant transformation, applications of transgenic plants, legislation, societal and ethical aspects

Position of the course

The student will become familiar with different techniques used for plant transformation. Several case studies will be discussed with the focus on regulation, usefulness, risk analysis, social aspects, etc.

Contents

I. Plant transformation
I.1. Plant transformation and regeneration: the basis
I.2. Agrobacterium mediated plant transformation
I.3. Direct Gene Transfer (DGT) methods
I.4. Expression of transgenes in plants
I.5. Inactivation of plant genes
I.6. New breeding techniques
I.7. Safety
II. Applications
II.1. Herbicide resistance
II.2. Insect resistance
II.3. Virus biology and resistance
II.4. Disease resistance & tolerance to abiotic stress
II.5. Yield and quality
II.6. Non-food & pharming
II.7. GMO regulations and discussions

Lab excercises: DNA analysis of transgenic plants, transient transformation. PC-practicals. Group work and presentations.

Initial competences

Knowledge of biochemistry, molecular biology, and plant biology

Final competences

1 being aware of different possible techniques to improve plants: breeding, mutagenesis, transgenesis, cisgenesis, new breeding technologies...
2 distinguish the different applications of GMOs in agriculture and be aware of the commercially available products
3 substantiate the possibilities of using plants for the production of enzymes, fine chemicals, pharmaceuticals, etc.
4 understand the definitions of GMO, event, etc. especially in a regulatory context
5 discuss the regulatory steps needed before GMO commercialisation
6 critically evaluate scientific papers on GMOs including safety studies
7 compare transformation technologies for the development of improved plants
8 assess risks and benefits of specific GMO applications
9 discuss on genetic engineering applications with scientific arguments and in a multidisciplinary context
10 assess new scientific developments on genetic engineering and applications in a scientific and socio-economic context
11 adopt a positive attitude towards independent and life long learning
12 have good social and communicative skills to function in a team
13 appreciate the public opinion and the GMO discussion
14 formulate, based on scientific data, a personal opinion on GMO applications without disrespect for a different opinion of others
15 critically analyse massive amounts of often contradictory web based information and integrate this with scientific data to come to a scientifically sound conclusion

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

Group work, Seminar, Lecture, Practical, Peer teaching

Extra information on the teaching methods

Besides the lectures, several aspects of GMO applications and the public GM debate are being discussed in class. During the microteaching each group of 4 students searches for information on a specific topic, which is then presented for and discussed and evaluated by the whole group.This process also uses peer evaluation.

Study material

None

References

Course content-related study coaching

Extra information and explanation can be obtained through e-mail, personal contact or UFORA

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Written assessment with open-ended questions

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

Oral assessment, Written assessment with open-ended questions

Examination methods in case of permanent assessment

Participation, Peer and/or self assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Calculation of the examination mark

The evaluation of the theory counts for 3/4, the permanent evaluation of the excercises, microteaching and participation for 1/4.
The permanent evaluation score of the first exam session stays valid for the resit.
Students who eschew periodic and/or permanent evaluations for this course unit may be failed by the examiner. The score is then max. 8/20.