GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2020-2021

Plant Biotechnology (0000145)

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 4.0 **Study time 108 h** **Contact hrs** 48.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 2)	English	Incheon	microteaching	3.0 h
			lecture	20.0 h
			seminar: practical PC room classes	4.0 h
			practicum	12.0 h
			group work	9.0 h

Lecturers in academic year 2020-2021

Gheysen, Godelieve	LA25	lecturer-in-charge

Offered in the following programmes in 2020-2021	**crdts**	**offering**
Bachelor of Science in Molecular Biotechnology	4	A

Teaching languages

English

Keywords

plant transformation, transgenesis & cisgenesis, gene silencing, gene editing, applications of transgenic plants, legislation, ethical aspects

Position of the course

This course is an introduction to plant biotechnology. 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, societal 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 technologies
I.7. Safety assessment
II. Applications
II.1. Herbicide resistance
II.2. Insect resistance
II.3. Disease resistance & tolerance to abiotic stress
II.4. Yield and quality
II.5. Non-food & pharming
II.6. GMO regulations and discussions
Lab excercises: Transformation of rice. CRISPR gene editing. Bioinformatics PC-excercises. Group work and presentations.

Initial competences

Knowledge of biochemistry, molecular biology, and plant biology

Final competences

1 Know different possible techniques to improve plants: breeding, mutagenesis, transgenesis, cisgenesis, genome editing and other new breeding techniques...
2 Be able to distinguish the different applications of GMOs in agriculture and to describe the commercially available products.
3 Substantiate the possibilites of using plants for the production of enzymes, fine chemicals, pharmaceuticals, etc.
4 Be able to explain the definitions of GMO, event, etc. especially in a regulatory context.
5 Be able to discuss the regulatory steps needed before GMO commercialisation.
6 Critically evaluate scientific papers on GMOs including safety studies.
7 Know and critically compare transformation technologies for the development of improved plants.
8 Know how to assess, risks and benefits of specific GMO applications.
9 Collect and critically analyze data from scientific papers and make a scientifically valid summary.
10 Discuss genetic engineering applications with scientific arguments and in a multidisciplinary context.
11 Assess new scientific developments on genetic engineering and applications in a scientific and socio-economic context.
12 Adopt a positive attitude towards independent and lifelong learning.
13 Communicate in English via oral presentation.
14 Appreciate the public opinion and the GMO discussion.
15 Formulate, based on scientific data, a personal opinion on GMO applications without disrespect for a different opinion of others.
16 Collect and critically analyze 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, lecture, microteaching, practicum, seminar: practical PC room classes

Extra information on the teaching methods

lectures 20 hrs
practicals 12 hrs
PC practicals 4 hrs
microteaching 3 hrs
group work 9 hrs

Learning materials and price

A compact syllabus is available. Powerpoint presentations and movies explaining basic principles are available on Minerva.

References

Plant Biotechnology. The genetic manipulation of plants. Slater, Scott and Fowler, 2nd edition. Oxford University Press

Course content-related study coaching

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

Evaluation methods

end-of-term evaluation and continuous assessment

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent evaluation

Participation, assignment, peer assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Calculation of the examination mark

The evaluation of the theory counts for 3/4, the permanent evaluation of the excercises, microteaching and participation to discussions for 1/4.