

Molecular Plant Breeding (C003100)

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	<i>(nominal values; actual values may depend on programme)</i>		
Credits 3.0	Study time 80 h	Contact hrs	25.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	English	Gent	group work	7.5 h
			lecture	15.0 h
			excursion	2.5 h
			online lecture	0.0 h
			online group work	0.0 h

Lecturers in academic year 2020-2021

Roldàn-Ruiz, Isabel	WE09	lecturer-in-charge
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Offered in the following programmes in 2020-2021

	crdts	offering
Master of Science in Bioinformatics (main subject Systems Biology)	3	A
Master of Science in Biochemistry and Biotechnology	3	A
Master of Science in Plant Biotechnology	3	A
Exchange programme in Biochemistry and Biotechnology (master's level)	3	A

Teaching languages

English

Keywords

Plant breeding, genetics, genomics, DNA-marker, linkage map, association mapping, quantitative trait locus (QTL), marker assisted selection (MAS), biodiversity.

Position of the course

This course is specially designed for students who want to follow a specialisation in the field of molecular plant genetics. The use of recent molecular techniques for the characterisation of plant genomes in the context of breeding and of biodiversity conservation will be presented. This course is related to the courses 'Genetics II' (3rd Bachelor in Biochemistry and Biotechnology) and 'Biostatistics' (1st Master in Biochemistry and Biotechnology).

Contents

- 1 Principles of plant breeding
- 2 DNA-fingerprinting of plants - SSR, SNP and interpretation of DNA-marker results
- 3 Next Generation Sequencing om plantengenomen te karakteriseren
- 4 Genetic relationships and diversity
- 5 Linkage, 'Linkage Disequilibrium' (LD) and association genetics
- 6 Strategies for the identification of markers linked to traits of agricultural relevance
- 7 Marker assisted selection

Initial competences

To have a general knowledge of plant genetics and to have successfully taken the courses 'Biostatistics' and 'Genetics II' or to have reached the final objectives of these courses.

Final competences

- 1 Knows the methodologies available for the identification of genome regions associated to plant traits.

- 2 Knows the applications of DNA-markers in the context of plant breeding.
- 3 Masters the principles of 'marker assisted selection' and 'genomics assisted selection'.
- 4 Can analyze and solve simple problems in the field of molecular plant breeding.
- 5 Can implement methods for the evaluation of the diversity present in natural and artificial populations.

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, group work, lecture, online group work, online lecture

Extra information on the teaching methods

Hoorcolleges illustrating and discussing theoretical concepts, and using examples from literature.

Two sessions to prepare the group assignment and to discuss with the teacher the content, the structure, the bottlenecks and the progress.

Excursion to discuss plant breeding in practice.

Due to COVID19 alternative options will be implemented if necessary.

Learning materials and price

All materials will be provided in electronic form. Materials include: notes, presentations and research papers.

Estimated total cost: 40 EUR.

References

None.

Course content-related study coaching

Personal: through electronic appointments.

Interactive help using Ufora.

Evaluation methods

end-of-term evaluation

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

Written examination with open questions, assignment, peer assessment

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

Written examination with open questions, assignment, peer assessment

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

- Written exam with open questions and questions related to applications.

- Assignment: to be carried out in group with one final evaluation; peer assessment is used for this part.

Calculation of the examination mark

The written exam will have a weight of 65% in the calculation of the final score; the assignment will have a weight of 35% in the calculation of the final score (taking the peer-evaluation into consideration).