

Course Specifications

From the academic year 2017-2018 up to and including the

Molecular Plant Breeding (C003100)

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

Credits 3.0 Study time 80 h Contact hrs 25.0 h

Course offerings and teaching methods in academic year 2018-2019

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

Lecturers in academic year 2018-2019

Roldàn-Ruiz, Isabel	WE09	lecturer-in-charge
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Offered in the following programmes in 2018-2019

	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
Exchange Programme in Bioinformatics (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 Basic principles of plant breeding
- 2 DNA-fingerprinting of plants - DNA-marker technologies and interpretation of DNA-marker results
- 3 Estimation of genetic relationships, diversity using DNA-markers
- 4 Germplasm characterisation
- 5 Factors which influence biodiversity - population genetics
- 6 Linkage, 'Linkage Disequilibrium' (LD) and association genetics
- 7 Strategies for the identification of markers linked to traits of agricultural relevance
- 8 Marker assisted selection programs
- 9 Genomics breeding

Initial competences

To have a general knowledge of 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 A clear view of methodologies available for the identification of genome regions associated to plant traits.
- 2 Knowledge of DNA-marker technologies and their fields of application.
- 3 Good knowledge of 'marker assisted selection' and 'genomics assisted selection'.

- 4 Able to analyse and solve simple problems in the field of molecular plant breeding.
- 5 Knows and 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

Extra information on the teaching methods

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

Excursion to discuss breeding activities with ILVO breeders.

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

Learning materials and price

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

Estimated total cost: 30 EUR.

References

None.

Course content-related study coaching

Personal: through electronic appointments.

Interactive help using Minerva.

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).