



COURSE CATALOGUE

ULS SEMESTER 2

emPLANT+ COURSE CATALOGUE
ERASMUS MUNDUS MASTER PROGRAMME IN PLANT BREEDING

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Joint Courses

JOINT COURSES	Description, contents, learning outcomes	Implementation:
Pilot case	<p>The pilot case is a case study to apply the project management tools to a breeding program. First students by group o choose a species to be ameliorated. Then, find a character or several as goal for the breeding strategy. After, they check that there is a potential market for this new variety and verify that farmers will want to cultivate it and consumers too (1-week work) To be accomplished during all the first year. Secondly students are going to define the potential market for their product (seeds), but also the market for the new variety (consumers). Thirdly they need to create a structure who is going to breed the new variety, and define the role of each student on the group in this structure (company, association...)</p>	<p>The introduction to the Pilot Case will take place during the Joint Integration Week where the groups will be formed based on the specialty chosen by the students for Y2. During the first year the students will work in groups with their tutors and via telephone/video conference/email. During S3 the Pilot Case will be finalized with the tutors at the host university and by telephone/video conference/email among the group members. Two juries will be organized. The first jury at the end of S1 will evaluate the content and the form of the work and especially the project management content. At the end of S2 a written report and a second presentation more focused on the breeding schema will be evaluated. At the end of S3 a jury composed of the local tutors, the Coordinators for Y1 and an expert in Project Management will judge the defense of the Pilot Case. The juries of S1 and S3 will be carried out the same day for logistic reasons.</p>
Intellectual Property & Plant Breeders' Rights	<p>The two systems (plant patent and plant breeders' right) and implication for breeder rights. Breeder's exemption and farmer privilege. From practical examples, lecturers from institutions and companies will bring pros and cons for each system. Infringement cases and violations will be analyzed.</p> <p>UPOV origin and historical steps. DCU and VCU notions.</p> <p>The transgenic varieties, the mutant and somaclonal variants will allow to introduce the notion of Essentially Derived variety (EDV). Current and potential application of molecular markers and next generation sequencing will be discussed.</p>	<p>This course will be offered in form of a UPOV (www.upov.int) online course. During one month, the student can access and complete 25h of online courses at their own rhythm. The course will be validated by a written online examination. Each first-year university will nominate tutors who will accompany the students. In addition, UPOV will nominate a contact person to accompany the students.</p>
Summer Field Camp at the end of year 1 (June)	<p>The objective of this summer intensive program is to immerse students in two crops breeding chains. One week for a major crop such as corn or wheat and the second on a legume or fruit crop (green bean, apple). During each week students are going to go visit the main actors related to breeding for the selected crop from farmers, to several breeders (diversity</p>	<p>All students will come together after the first year and spend the Field Camp together.</p>

conservation, breeding, laboratory) or public research institutions involved in basic research , seed industry and seed multiplication farmers and maybe food industry to see the quality requirements for the specific transformation. To have a full panorama of this crop.

The main learning objective is to have an integrated view of the food chain from the breeding till the final transformation of the product. Secondary objectives are to understand the different actions of breeding companies, how they integrate the requests of the consumer. To haw a deeper knowledge on at least two crops which are managed differently, as are the cereals and the vegetables. And understanding the importance of the seeds quality.

Semester 2 ULS

SEMESTER 2 ULS (30 credits)	Objectives	ECTS
Plant Microbe Interaction	<p>To acquire knowledge to breed for plant resistance. To be able to differentiate between the qualitative and quantitative resistance and be able to choose the most adapted breeding methods. Be able to select alternative protection methods using effectors, elicitors and beneficial microorganisms. Be able to follow the epidemiology of plant diseases, their interaction with other factors as insects and to implement strategies to keep plant resistance.</p> <p>Be able to identify the plant resistance gene markers and gene expression analysis with molecular markers.</p>	5
Plant genetic resources and diversity	<p>At the end of this course student will understand the Importance of germplasm in breeding projects. The different types of evaluation of a collection, morphological, chemical, technological, molecular and their representations. Allelic richness, diversity structure. How to manage and use the genetic diversity: core collection and sampling strategies.</p>	2
Quantitative genetics	<p>Basics for Quantitative genetics Definitions of qualitative and quantitative traits. Understanding major gene(s) vs polygenic control and inheritance. Analyze variance components of quantitative traits. Definition of heritability and estimates, genetic gain. Introduction to Molecular quantitative genetics and genomic selection.</p>	3
Seed and plant production and certification regulation guidelines	<p>Importance of quality in seed and plant development and production. Notion of seed and plant certification. Comparison of certification processes and practical achievement in different regions.</p> <p>Understand the importance of physiological quality, sanitary conditions and genetic conformity for seed and plant productions.</p>	3
Breeding strategies and methods of selection	<p>To understand the diversity of breeding strategies in several crops (continental and tropical) with several strategies: (i.e.; organic, participative)</p> <p>To be able to identify the needs on the market in terms of ideotype and how to achieve to reach this ideotype combining classic and molecular breeding strategies.</p>	3
Relational Databases – Phenotyping	<p>In this course, you will learn what is a relational database, how to create a good database model with a good relational database on Access software. How to query data on it with SQL language. A focus will be done on how to collect, to store data safely and to mobilize many data, using excel and classic database.</p>	4

Job marketing	<p>To be able to build up a presentation email</p> <p>To be able to build up a curriculum vitae</p> <p>To be able to build up a motivation letter</p> <p>To be performant during a recruitment</p>	1
Internship + Minor Thesis	<p>The minor thesis internship takes place in a company or research institution. It will familiarize student with a seed company and breeder position.</p> <p>Student have to make a minor thesis report.</p> <p>Discover the business sector and its environment. Work in one of the departments and understand how it works. Study a problem related to the activity. Reflect, structure and make a personal contribution which is useful to this structure</p>	5
French as a foreign language	Following semester 1 course. Reach the B1 level	Certificate
Spanish as a foreign language	Following semester 1 course. Reach the B2 level	Certificate