



# COURSE CATALOGUE

## ULS SEMESTER 1

**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>

## Semester 1 ULS

SEMESTER 1 ULS (30 credits)	Objectives	ECTS
Cross culture & ethics	<p>To raise awareness and develop skills around culture and its impact on behavior in international teams. Students will draw on their own experience of learning within a multi-cultural team immersed in a host culture.</p> <p>Reading - implementation of the method of ethics: analysis, explanation of the differentiated arguments of the ethical issue.</p> <p>Know how to comment - discern the positioning that appears to us most relevant and be able to account for it. Be able to justify and explain contradictory arguments.</p>	1
Introduction to seed business	<p>Identify several factors going to impact the way of organizing companies on a regional and global scale such a long-term activity as the breeding and the selection, in relation with transversal technologies and breeder's profiles: technological traits, biotechnologies, markets, climatic changes, natural resource limitations, exchanges between countries and continents.</p>	2
Introduction to algorithmics	<ul style="list-style-type: none"> <li>- Know how to use the fundamental structures of the algorithmics</li> <li>- Know how to analyze a problem and solve it with an algorithm</li> <li>- To implement an algorithm</li> </ul> <p>To use a procedural language (C language)</p>	1
Statistics	<p>Develop knowledge on data distribution, estimation procedures and confidence by examining the area of interval estimation. Acquire the tools to identify the appropriate statistical test to use regarding a scientific question. Perform a variety of univariate and multivariate analyses using R software (coding, data visualization, interpretation). Being able to mobilize skills in various context of data analysis.</p>	3
Plant Reproduction systems	<p>To be able to identify the reproduction systems of any species</p> <p>To understand the needs to achieve a cross in a species</p> <p>To understand the seed quality requirements</p> <p>To be able to identify the vegetative reproduction structures and manage them</p>	2
Fundamental genetics	<p>Master fundamental concepts of plant genetics. Being able to analyze and interpret transmission mechanisms of hereditary characters. Develop advanced knowledge on haploid organism genetics, extrachromosomal inheritance and epigenetics.</p>	3

Breeding Strategies	To be able to define the breeding goals in the midterm and long term, reasoning the breeding strategy adapted to the objectives, species, germplasm, traits to be selected according to the dimension of the breeding program, breeding tools and selection methods.	3
Introduction to plant pathology	The objective is to study the principals of the plant-microorganisms interaction. It introduces the major plant pathogen groups (viruses, viroids, phytoplasmas, bacteria, fungi, nematodes and the higher plant parasites) and the abiotic plant stresses (caused by environmental factors). It introduces also the importance of the beneficial microorganisms (e.g. PGPR, Plant-growth-promoting-rhizobacteria & AM, arbuscular mycorrhizae). Students study the scientific classification of theses microorganisms, their detection and quantification, and the general methods of control (chemical, biological & genetic).	3
Ecophysiology	Understand and analyze how a plant population grow and develop in its environment under optimal growing conditions and under stresses. Understand the impact on crop production Introduce the crop model concepts.	2
Experimental design	<ul style="list-style-type: none"> <li>- Understand the general principles of experimentation</li> <li>- Know the most classic devices used in plant experimentation</li> <li>- Perform statistical analysis of these devices</li> <li>- Choose the most suitable experimental device for a described situation.</li> </ul>	3
Population genetics	<ul style="list-style-type: none"> <li>- Extend the concepts of general genetics to populations.</li> <li>- Understand the models of population genetics.</li> <li>- Know how to describe a population in genetic terms.</li> <li>- Use these achievements in the context of biodiversity and evolution.</li> </ul>	2
French as a foreign language	This language course aims at providing students with the necessary language tools to interact successfully in everyday life and in basic professional situations. The objective is that students get the B1 level in French at the end of the year in order to be able to get the Engineers Diploma.	2
Spanish as a foreign language	This language course is targeted at students who chose UPV as Y2 destination and who still need to bring their Spanish to a B2 level for everyday life and professional situations.	Certificate