



# COURSE CATALOGUE

## SLU 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 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 (<a href="http://www.upov.int">www.upov.int</a>) 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 conservation, breeding, laboratory) or public research institutions</p>	<p>All students will come together after the first year and spend the Field Camp together.</p>

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 SLU

SEMESTER 2 SLU (30 credits)	Objectives	ECTS
Plant Biology for Breeding and Protection	<p>The course focuses on plant biology for breeding and protection in a global perspective. Bioinformatics with focus on analyzing –omics data to improve and better understand plant breeding and protection will be an important part of the course.</p> <p>The course content consists primarily of the following points:</p> <ul style="list-style-type: none"> <li>- Process of plant breeding (overview, genetics and genetic resource enhancement etc.)</li> <li>- Genotype-by-environment interaction and adaptation to environmental stresses.</li> <li>- Pre/Breeding programs in Sweden and worldwide</li> <li>- Biology of plant pathogens and pests</li> <li>- Plant disease diagnosis, management and control</li> <li>- Plant pathogen interactions</li> <li>- Plant immunity</li> <li>- Modern breeding tools, including GM and genome editing, and their application in plant breeding and protection</li> <li>- Ethical questions related to plant breeding and protection and breeders' rights</li> <li>- Bioinformatics and –omics data for plant breeding and protection</li> </ul>	15
Sustainable Plant Production – from Molecular to Field Scale	<p>The course offers a synthesis and further deepening of the basic principles of sustainable production in agriculture, horticulture, and forestry. The factors and processes that affect the sustainability and multifunctionality of production systems are integrated, by considering the different scales from the molecular to the stand level. The course also provides knowledge of the associated relevant methodologies. The course presents a review of the relevant theoretical basis and a set of specific examples relative to selected plants and production systems.</p> <p>On completion of the course, the student will be able to:</p> <ul style="list-style-type: none"> <li>- describe the origin of cultivated plants, the basic breeding strategies for them, and their molecular and physiological features relevant for production</li> <li>- discuss the effects of plant features and growing conditions on the production, yield and resource use efficiency of cultivated plants</li> <li>- evaluate the impacts of different management solutions on the production and yield of cultivated plants, with reference to different criteria for sustainability and multifunctionality</li> <li>- plan and execute the research activities necessary to answer specific research questions in the subject area, under limited guidance</li> <li>- present the results of these research activities in a scientifically-appropriate way</li> </ul>	15
Swedish as a foreign language	<p>The topics range from introducing and telling about oneself to greetings, family, food, shopping, weather and telling the time. The topics also include daily activities, living, transport and the immediate surroundings.</p> <p>The aim is to introduce students not only to the basic structures of Swedish, but also to the Swedish way life. Simple everyday conversation is practised.</p>	Certificate

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. Students will learn Spanish at the rate of 2 hours per week. In addition to classroom instruction, students will realize interactive assignments. This course is carried out in close collaboration with UPV so as to ensure that the students obtain the language level needed.	Certificate
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