



# COURSE CATALOGUE

# SZIU SEMESTER 1

**emPLANT+ COURSE CATALOGUE**

**ERASMUS MUNDUS MASTER PROGRAMME IN PLANT BREEDING**

**Contents**

Joint Courses.....	3
Semester 1 SZIU .....	4

## 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>

## Semester 1 SZIU

SEMESTER 1 SZIU (30 credits)	Objectives	ECTS
Introductory R	This course is a general introduction to R with emphasis on tools used for data analysis. R has become the lingua franca in data analysis. However, R itself is a programming language and the learning curve can be steep. This course aims to help students with their very first steps with R: data import, subsetting, ggplot2 graphic system, other basic functions. For students with limited or no programming background. Socrative is used for participant feedback and checking comprehension.	3
Plant reproduction and reproduction biology	During the course students will be familiarized with the different reproductive organs of plants and will also gain experience in the field of <i>in vitro</i> tissue culture of gametophytic tissues and different developmental stages of embryos	3
Applied genetics	The subject applies the professional vocabulary of communication in the field of genetics; discusses the problems of Genetics plant breeding purposes. Students will acquire the basic laws of classical genetics; learn to interpret the molecular genetic background of the dominance in the case of the round and wrinkled pea phenotype. Students will get acquainted with the basics of the population genetics and interpretation of the Mendelian rules-based population genetics. They learn the genetic bases of gametogenesis and the sexual and asexual reproduction	4
Molecular genetics	After completing their studies students are able to understand and interpret the adequate theoretical problems and the most important methodological approaches in molecular genetics. The course focuses on the following topics: experiments leading to the discovery of DNA as genetic material. Functions of DNA: replication, recombination, mutation; transcription in prokaryotes and eukaryotes. Concept of gene, structure of genes in prokaryotes and eukaryotes. Classes of eukaryotic nuclear DNA, genome components; C- K- and N-value paradoxes. Biochemical, physico-chemical, molecular analysis of DNA. Bases of <i>in vitro</i> recombination: vectors, gene cloning, identification and selection of bacterial colonies harbouring recombinant plasmids. Characteristics of genetic regulation in prokaryotes and eukaryotes; antisense RNA technique, RNA interference. Introduces the „classical” epigenetic phenomena and their molecular background and the role epigenetics in regulation of gene expression.	4
Plant physiology and stress biology	The students will have the capability of recognizing professional problems, of their versatile, interdisciplinary approach and of exploring and formulating a detailed conceptual and practical background for solving them. The course material concentrates both on classical aspects of plant physiology and on plant ecophysiology. Emphasis is given to understanding and application of simple simulation models, utilizing basic physical and plant physiological principles during lectures and practices.	3

Microbiology and microbial biotechnology	Students participating in the course should know the basic biotechnological regularities and can apply this knowledge. Practical skills – able to execute safely a series of experiments. Use laboratory and field-based methods to generate data. Prepare technical reports; The course covers the following topics: introduction to the main classes of microorganisms – their physiology, morphology and genetics; role and activity of microorganisms in the biosphere; microbial growth and reproduction; metabolites of microorganisms and their function; role of microorganisms in the soil, animal production, crop production and environmental	5
Basics of plant breeding	Students will learn the basic theory of plant breeding and practical methods, as well. This course covers all theoretical and practical methods that are necessary for managing a professional breeding programme for autogamous and allogamous plant species. It includes both basic and more complex breeding and selection methods. Also, new technological developments and their application in breeding programmes are part of the curriculum.	3
Hungarian studies I. (Language and culture)	The course helps the students to adapt themselves to the Hungarian society by providing a basic language and cultural introduction	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