

Course name:
Crop Improvement

ECTS	4
Course status	<i>facultative</i>
Course final assessment /evaluation of outcomes	<i>Exam</i>
Prerequisite	<i>plant biology, basic biochemistry, conventional and molecular genetics</i>

Main field of study:

Agriculture and Horticulture, Biology and Biotechnology (Erasmus+)

Educational profile	General academic
Code of studies and education level	bachelor/engineer (SI) or master of science (SM)
Semester of studies	Summer
Language of instruction	English

Course offered by:

Name of faculty offering the course	Biotechnology and Horticulture
Name of department offering the course	Plant Biology and Biotechnology
Course coordinator	Prof. Dariusz Grzebelus

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands			
CRI_W1	Principles of conventional and molecular plant breeding	EPB2_W01 EPB2_W04	R,P
CRI_W2	Principles of genetic selection	EPB2_W04	R,P
CRI_W3	Applications of biotechnology in crop improvement	EPB2_W01 EPB2_W02	R,P
SKILLS – student is able to			
CRI_U1	Explain strategies for development of new cultivars	EPB2_U05	R,P
CRI_U2	Characterize methods of conventional plant breeding	EPB2_U05	R,P
CRI_U3	Run a simple plant tissue culture experiment	EPB2_U01	R,P
CRI_U4	Perform genotyping using simple PCR-based techniques	EPB2_U01	R,P
SOCIAL COMPETENCIES – student is ready to:			
CRI_K1	Discuss advantages and disadvantages of the use of modern technologies in plant breeding	EPB2_K03 EPB2_K04	R,P

Teaching contents

Lectures	30 hours
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Topics	<ol style="list-style-type: none"> 1. Genetic resources, crop domestication, population genetics. 2. Principles of plant breeding, methods of controlled pollination, hybrid breeding. 3. Plant tissue cultures, molecular breeding, genetic modifications, genome editing.
Accomplished learning outcomes	EPB2_W01, EPB2_W02, EPB2_W04, EPB2_K03, EPB2_K04
Means of verification, rules and criteria of assessment	<i>Test exam, single choice (51%)</i>
Classes:	30 hours
Topics	<ol style="list-style-type: none"> 1. Morphological and chemical evaluation of breeding materials. 2. Controlled pollination. 3. In silico simulations of genotypic and phenotypic changes in the course of breeding (selection, genetic drift, etc.). 4. In vitro micropropagation and haploid production. 5. Identification of DNA polymorphisms. 6. Visit to a plant breeding company.
Accomplished learning outcomes	EPB2_U01, EPB2_U05
Means of verification, rules and criteria of assessment	<i>Case report, demonstration of practical skills (49%)</i>

References:

Basic	<i>Molecular techniques in crop improvement. Mohan Jain S., Brar D.S. (eds) 2010. Springer, ISBN 978-90-481-2966-9.</i> <i>Transgenic crop plants. Kole C., Michler C.H., Abbott A.G., Hall T.C. (eds). 2010. Springer ISBN 978-3-642-04808-1.</i>
Supplementary	<i>Genetics and breeding for crop quality and resistance. Scarascia Mugnozza G.T., Porceddu E., Pagnotta M.A. (eds) 1999. Kluwer, ISBN 0-7923-5844-9.</i>

Structure of learning outcomes

Area of academic study: R – Agricultural, forestry and veterinary sciences	3 ECTS **
Area of academic study: P – biological sciences	1 ECTS**

Structure of student activity

Contact hours	66 hrs.	2.5 ECTS**
Including:		
lectures	30 hrs.	
classes and seminars	30 hrs.	
consultations	4 hrs.	
participation in research	- hrs.	
obligatory traineeships	- hrs.	
participation in examination	2 hrs.	
e-learning	- hrs.	- ECTS**
student own work	40 hrs.	1.5 ECTS**

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts
** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes