

Course name:**Tissue cultures for crop improvement**

ECTS	3
Course status	<i>facultative</i>
Course final assessment /evaluation of outcomes	<i>Exam</i>
Prerequisite	knowledge on plant biology, middle school level and basic knowledge on plant tissue cultures

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	Winter or summer
Language of instruction	English

Course offered by:

Name of faculty offering the course	Faculty of Biotechnology and Horticulture
Name of department offering the course	Department of Plant Biology and Biotechnology
Course coordinator	dr hab. Agnieszka Kielkowska, prof. UR

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands			
TCCI_W1	cell totipotency, characterize different in vitro techniques	EPB2_W01	R, P
TCCI_W2	defines somatic and gametic embryogenesis, haploidisation, somatic hybridization and other related to plants tissue cultures	EPB2_W02	R, P
TCCI_W3	aims of in vitro techniques and its utilization for crop improvement	EPB2_W04	R, P
SKILLS – student is able to			
TCCI_U1	work in tissue cultures lab, establish and maintain experiments	EPB2_U01	R, P
TCCI_U2	apply in vitro techniques to increase biodiversity in plants	EPB2_U01 EPB2_U05	R, P
SOCIAL COMPETENCIES – student is ready to:			
TCC_K1	work in team, formulate objective opinions on the application of in vitro techniques in crop improvements	EPB2_K02 EPB2_K03	R, P

Teaching contents

Lectures	15 hours
Topics	<ol style="list-style-type: none"> 1. Introduction, history, major concepts and importance 2. Micropropagation 3. Meristem culture and pathogen-free plants 4. Haploid production

	5. Somaclonal variation and in vitro selection 6. Protoplast cultures and somatic hybridization 7. Interspecific crossing and embryo-rescue
Accomplished learning outcomes	TCCI_W1-W3, TCCI_K1
Means of verification, rules and criteria of assessment	test (70% of share in final grade)
Classes:	15 hours
Topics	1. Laboratory facilities and equipment and media preparation 2. Morphogenesis in <i>Nicotiana tabacum</i> 3. Micropropagation 4. Meristem culture and pathogen-free plants in <i>Allium sativum</i> 5. Haploid production by means of androgenesis 6. Somaclonal variation and in vitro selection for salinity 7. Protoplast cultures in <i>Brassica sp.</i> 8. Observations of established cultures and analysis of the results
Accomplished learning outcomes	TCCI_U1-U2, TCCI_K1
Means of verification, rules and criteria of assessment	conducting the experiments and preparation of the report (30% of share in final grade)

References:

Basic

Sathyanarayana BN. 2007. Plant Tissue Culture: Practices and New Experimental Protocols I. K. International Pvt Ltd

Plant Propagation by Tissue Culture 2008. Edited by Edwin F. George, Michael A. Hall, Geert-Jan De Klerk. Springer

Biotechnologies for crop improvements. 2018. Gosal SS, Wani SH (Ed.). Springer

Supplementary

<http://www.springerlink.com/content/n5tm30/?p=b93c5ea7cf094758ba340e329c6dfa91&pi=1>

<http://www.springerlink.com/content/x57035/?p=b93c5ea7cf094758ba340e329c6dfa91&pi=2>

Structure of learning outcomes

Area of academic study: R – Agricultural, forestry and veterinary sciences	1,0	ECTS **
Area of academic study: P – biological sciences	2,0	ECTS**

Structure of student activity

Contact hours	36	hrs.	1,4	ECTS**
Including:				
lectures	15	hrs.		
classes and seminars	15	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.	1,6	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