COURSE DESCRIPTION CARD

<table>
<tr><td colspan="10">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="5"></td><td colspan="2">Degree level and programme type</td><td colspan="2"></td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="5"></td><td colspan="2">Study profile</td><td colspan="2">Academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="5" rowspan="2">Plant tissue culture</td><td colspan="2">Course code</td><td colspan="2">IS-FCEE-00259W</td></tr>
<tr><td colspan="2">Course type</td><td colspan="2">Erasmus</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>Winter</td></tr>
<tr><td>15</td><td></td><td>30</td><td></td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>4</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Biology, Biochemistry</td></tr>
<tr><td>Course objectives</td><td colspan="9">The aim of the course is to introduce students to selected in vitro techniques and their application in biotechnology and applications of isolated plant cells and tissues culture as well as to prepare them for conducting scientific research.</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: Basic concepts; advantages and disadvantages of cell and tissue culture; history of research; differences of plant cell culture. Explants and organogenesis. Culture media. Plant growth regulators. Effects of action, transport and distribution, examples of natural and synthetic plant growth regulators. Callus tissue. Cell suspensions. Callus production in vivo and in vitro; morphology and physiology of callus cells; callus tissue genome; in vitro callus tissue preparation and passage; culture monitoring; callus organogenesis. Plant growth regulators. Callus tissue. Cell suspensions. Root cultures. Plant cell cultures in bioreactors. Applications of plant tissue cultures.
Laboratories: devices, tools, laboratory equipment. Safety and hygiene in the laboratory. Media: types, components, working solutions. Preparation of media of different compositions for the establishment of in vitro cultures. Micro propagation of plants: cultures of apical and lateral buds, meristems. Release of plants from pathogens. Influence of hormones on organ differentiation. Passages and acclimatization of the obtained regenerants. Observation of experimental results and their interpretation - binocular and inverted field microscope, photographic documentation.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">L – lecture, LC – laboratory classes</td></tr>
<tr><td>Assessment method</td><td colspan="9"></td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">has knowledge of the basic types of in vitro plant breeding and is able to explain the process of genetic transformation.</td><td colspan="2"></td></tr>
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LO2	is able to estimate and assess the morphogenetic potential of explants isolated from arable crops and their usefulness in biotechnological experiments that may be important in agricultural production.	
LO3	knows and is able to perform simple research tasks in sterile conditions (preparing the medium, disinfecting plant material, cutting out explants and passing culture) individually and in a team.	
LO4	can indicate the possibility of practical use and works in a team performing analyses of the basic cellular processes and is prepared to critically assess knowledge and content received from the field of cell culture.	
LO5		
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	Written exam, Colloquium	**L, LC**
LO2	Colloquium	**LC**
LO3	Written exam, Colloquium	**L, LC**
LO4	Colloquium	**LC**
LO5		
Student workload (in hours)		**No. of hours**
Calculation	Participation in lectures	**15**
	Participation in laboratory classes	**30**
	Preparation for the written exam in lectures	**10**
	Preparation for laboratory tests	**10**
	Preparation for and attendance at the examination	**10**
	Participation in consultations	**5**
	TOTAL:	

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	**55**	**2**
Student workload – practical activities	**65**	**2,6**

Basic references	Buchowicz A. Molecular biotechnology, PWN, Warsaw, 2013.	
Supplementary references	Davis J.M. Basic cell culture. Oxford University Press. 2001.	
Organisational unit conducting the course	**Department of Chemistry, Biology and Biotechnology**	**Date of issuing the programme**
Author of the programme	**Dr hab inż Elżbieta Wołejko**	**14.01.2022**

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar