

## COURSE DESCRIPTION (SYLLABUS)

1.	Course:  <b>Plant Cell Culture Techniques</b>
2.	Language of instruction  <b>English</b>
3.	Faculty:  <b>Faculty of Biotechnology</b>
4.	Course/module code:  <b>29-BT-S1-E4-En...</b> (the code will be set soon)
5.	Course/module type ( <i>mandatory or elective</i> ):  <b>elective</b> - choice limited to <b>Plant</b> and <b>Animal</b> Cell Culture Techniques
6.	Programme:  <b>Biotechnology</b>
7.	Study cycle ( <i>1st/2nd</i> ):  <b>1<sup>st</sup> cycle</b>
8.	Year:  <b>2nd</b>
9.	Semester ( <i>autumn or spring</i> ):  <b>spring</b>
10.	Form of tuition and number of hours:  Lecture: <b>15 h</b>
11.	Coordinator(s):  <b>Anna Kulma, Prof.</b>
12.	Initial requirements ( <i>knowledge, skills, social competences</i> ):  <b>Basic knowledge of biochemistry, botany and plant physiology.</b>
13.	Objectives:  <b>The classes are designed to familiarize students with the different types of plant tissue cultures, the requirements for their growth, and practical applications of plant tissue cultures in basic science, plant breeding, biotechnology and pharmaceutical industry.</b>
14.	Content:  <ul style="list-style-type: none"> <li>• <b>Types of tissue cultures, tissue cultures derived from various organs and cell types (stem culture, callus culture, root culture, anther culture, suspension culture).</b></li> <li>• <b>Equipment used for plant cell cultures, cell-culture set-up and maintenance, nutritional requirements of tissue cultures, used media and supplements including the use of plant hormones in tissue cultures.</b></li> <li>• <b>Plant variability in tissue cultures, including genetic and epigenetic changes.</b></li> </ul>

	<ul style="list-style-type: none"> <li>• The use of tissue cultures in the production of metabolites, and pharmaceutical proteins including the creation of transgenic plants and root hair culture.</li> <li>• Use of tissue cultures in plant propagation and plant breeding.</li> <li>• Storage of cultures including cryopreservation and artificial seed technology.</li> <li>• Quality testing of tissue cultures, microbial contamination.</li> </ul>	
15.	<p>Learning outcomes:</p> <p>Student:</p> <ul style="list-style-type: none"> <li>• knows the basic concepts, terms and research methodology used in plant biotechnology and plant tissue cultures;</li> <li>• has knowledge in the field of basic research techniques and tools used in plant tissue cultures, nutritional requirements of tissue cultures, preparation of media, basic principles of work with tissue cultures;</li> <li>• has knowledge in the field of genetic modification of plants, their analysis and uses;</li> <li>• has knowledge about the use of tissue cultures in research, agriculture and industry;</li> <li>• reads and understands scientific literature in the fields of plant science;</li> <li>• has the ability to critically analyse and select information, especially from electronic sources, including literature databases to acquire knowledge in the field of biotechnology, plant tissue culture and plant breeding;</li> <li>• can apply scientific language and appropriate scientific terminology in problem discussions with specialists in the field of plant science;</li> <li>• has the ability to self-educate in the field of selected thematic areas; reads with understanding scientific literature in the field of plant science;</li> <li>• understands the need to learn throughout life;</li> <li>• understands the need for systematic familiarization with professional literature in order to broaden and deepen knowledge.</li> </ul>	<p>Outcome symbols:</p> <p>K1_W01, K1_W06, K1_W08, K1_W09, K1_W10, K1_U02, K1_U03, K1_U04, K1_U08, K1_U09, K1_U12, K1_U14, K1_K01, K1_K02, K1_K03</p>
16.	<p>Recommended literature:</p> <ul style="list-style-type: none"> <li>• <u>Plant Tissue culture, Techniques and Experiments</u> by Roberta H. Smith, Academic Press, 2012;</li> <li>• <u>Plant Propagation by Tissue Culture</u> by E. F. George, M. Halle, Springer 2008;</li> </ul>	

	<ul style="list-style-type: none"> <li>• <b><u>Plant Tissue Culture, Development and Biotechnology</u> by R.E.Trigano, D.J.Grey, CRC Press, 2011;</b></li> <li>• <b>Scientific journal papers recommended during lectures.</b></li> </ul>	
17.	Methods of verification of the assumed learning outcomes: <b>Written final test</b>	
18.	Conditions of earning credits: <b>Attendance of at least 50% of lectures, at least 50% points on final written test.</b>	
19.	Student's workload:	
	Activity	Number of hours for the activity
	Hours of instruction (as stipulated in study programme) : Lect.: <b>15 h</b>	15 h
	Student's own work: <ul style="list-style-type: none"> <li>• <b>reading of the indicated literature</b></li> <li>• <b>preparation for test</b></li> </ul>	35 h
	Total number of hours:	<b>50 h</b>
	Number of ECTS:	<b>2 ECTS</b>