

<b>Course name</b>	<b>Manipulations on Plant Protoplasts and Cells</b>	
<b>Course code</b>	<b>E.1z.MPC.SC.ECTIE.O (winter)</b> <b>E.11.MPC.SC.ECTIE. O (summer)</b>	
<b>Department</b>	<b>Unit of Botany and Plant Anatomy, Institute of Plant Biology and Biotechnology</b>	
<b>Faculty</b>	<b>Faculty of Biotechnology and Horticulture</b>	
<b>Course supervisor/Lecturer</b>	<b>Alina Wiszniewska Ph.D.; Barbara Piwowarczyk, Ph.D.</b>	
<b>General information</b>	<b>Semester</b>	<b>winter or summer semester</b>
	<b>ECTS credits</b>	<b>6</b>
	<b>Lectures total</b>	<b>10 h</b>
	<b>labs classes</b>	<b>20 h</b>
<b>Objective and general description</b>	The objective of the course is to present unique properties of plant protoplasts and possibilities of their exploitation in biological and agricultural sciences. Classes provide valuable practice on complete procedure of <i>in vitro</i> protoplast culture, as well as on microscopic and analytical techniques.	
<b>Lectures</b> <b>5 x 2h</b>	<ol style="list-style-type: none"> <li>1. Plant protoplasts as „plant stem cells”. Procedures of protoplast isolation and cultivation. Strategies aimed at promoting protoplast development.</li> <li>2. Cellular aspects of regeneration in protoplast cultures: regeneration of cell wall, reorganization of cytoskeletal elements,</li> <li>3. Manipulations on protoplasts: somatic hybrids, cybrids, protoplast transformation</li> <li>4. Selection in protoplast culture – protoclonal variation. Protoplasts in plant breeding.</li> <li>5. Protoplasts as models in biological sciences</li> </ol>	
<b>Classes</b> <b>4 x 5 h</b>	<ol style="list-style-type: none"> <li>1. Enzymatic isolation of protoplasts from plant materials. a) preparation of enzyme mixture, - b) incubation, c) observation of cell wall digestion</li> <li>2. Purification of protoplasts. Determination of protoplast viability. Culture establishment. Chemical fusion of isolated protoplasts.</li> <li>3. Detection of cell wall components during cell wall regeneration: visualization of cellulose, callose and cell wall proteins.</li> <li>4. Reaction of protoplasts on isolation stress – determination of stress response parameters in isolated protoplasts (antioxidant machinery – peroxidase, phenolic profile, antiradical activity)</li> </ol>	
<b>References</b>	<p>Plant Tissue Culture: An Introductory Text. 2013. Eds. Bhojwani S.S., Dantu P.K., Springer India.</p> <p>Plant Cell Culture. Essential Methods. 2010. Davey M.R., Anthony P. Willey-Blackwell.</p> <p>Plant Protoplasts: A Biotechnological Tool for Plant Improvement. 1986. T. Bengochea, J.H. Dodds, Chapman and Hall, New York</p>	