

<b>Subject name</b>	<b>Physiology of Stress in Plants</b>	
<b>Subject code</b>	<b>E1z.PSP.SC.ECTIE.O (winter) E1l.PSP.SC.ECTIE (summer)</b>	
<b>Department</b>	<b>Unit of Botany and Plant Physiology, Institute of Plant Biology and Biotechnology</b>	
<b>Faculty</b>	<b>Faculty of Biotechnology and Horticulture</b>	
<b>Subject supervisor/Lecturer</b>	<b>Anna Kolton Ph.D., Renata Wojciechowska Ph.D., Joanna Augustynowicz Ph.D., Krzysztof Tokarz Ph.D.</b>	
<b>General information</b>	<b>Teaching period</b>	<b>winter or summer semester</b>
	<b>ECTS credit</b>	<b>6</b>
	<b>Lectures total</b>	<b>15 h</b>
	<b>Lab classes</b>	<b>15 h</b>
<b>Objective and general description</b>	The main objective of the course is presentation and explanation of stress factors affecting plants and mechanism of plant reaction and tolerance. In particular will be discussed: water stress (drought and flooding, hypoxia), heat stress (low and high temperature, frost), radiation stress (low and high intensity of light, UV radiation), deficiency of minerals, salt stress, the stress of excess pollution. The effect of stress factors on the metabolism of plants. Mechanisms of tolerance and resistance.	
<b>Lectures 6 x 2 hours 1 x 3 hours</b>	1. Identification of plant stress factors, general plant responses to stress 2. Water stress (drought and flooding, hypoxia) 3. Heat stress (low and high temperature, frost) Radiation stress (low and high intensity of light, UV radiation) Deficiency of minerals, salt stress The stress of excess pollution Biotic stress	
<b>Lab classes 6 x 2 hours 7 x 3 hour</b>	1. Measurements of proline concentration 2. Measurements of isocoumarin concentration in carrot root 3. The effect of abiotic stress on cell membrane permeability 4. Measurements of malonaldehyde in plant tissue 5. Measurement of leaf fluorescence under abiotic stress 6. Determination of phenols with folin - Ciocalteu's reagent (Effect of mechanical wounding on phenols content) 7. The effect of hipoxia on some enzymes activity	
<b>References</b>	Physiology and molecular biology of stress tolerance in plants. Madhava Rao K.V., Raghavendra A.S., Janardhan Reddy K. (eds). 2006 Springer. Abiotic stress responses in plants. Ahmad P., Prasad M.N.V. (eds). 2012 Springer. Heavy metal stress in plants. Prasa M.N.V., Hagemeyer J. (eds). 1999 Springer.	