

Study program: Agricultural Sciences			
Type and level of study: Doctoral academic studies			
Course Title: Stress factors in agriculture			
Teacher(s): professor Ljubinko B. Jovanovic, PhD; research associate Filis Morina, PhD			
Status: Elective 1, II semester			
ECTS: 12			
Prerequisite: None			
The goal of the course: Acquiring knowledge about different adverse factors in agriculture (abiotic, biotic, anthropogenic) which may influence plant productivity and properties and quality of soil. Effects of these factors on processes in plants and soil. Means of overcoming the negative effects of these factors.			
The outcome of the subject: Understanding the effects of different stress factors in plants and soil and choosing right means for improving plant performance and soil conditions. Students will gain experience in organizing and performing experiments and data analysis. Ability to independently create experiments, suggest research topics and carry out research projects in this field. The course should enable students with knowledge and experience necessary to become involved in research in scientific institutes and faculties.			
Syllabus: <i>Theoretical study</i> - Definitions and classification of stress factors in agriculture. Detrimental effects in agriculture. Stress factors and plants. Plant-soil interactions. Effects of different abiotic factors (temperature, water, metal contamination, organic contaminants) on plants. Effects of these factors on metabolic status of plants, protective and adaptive mechanisms. Anthropogenic stress factors. Effects of water deprivation on soil and soil biota. Microorganisms and adverse soil conditions. Remediation of degraded soils. Strategies for overcoming stressful conditions in agro-ecosystems. <i>Practical classes</i> - Performing experiments in the field and under controlled conditions. Using different tools and equipment for analysis of soil and plants. Seminars and practical exercises with students on bachelor and master studies. Writing academic papers.			
Literature: <ol style="list-style-type: none"> 1. Taiz L, Zeiger E. Plant Physiology fifth edition, University of California, USA 2. Madhava Rao, K.V., Raghavendra. A.S., Janardhan Reddy, K. 2006. Physiology and Molecular Biology of Stress Tolerance in Plants. Springer, Netherlands. 3. Waisel Y., Eshel A., Kafkafi U. (Eds.). 2002. Plant Roots: The Hidden Half. Marcel Dekker, New York. 4. Rai, A.K., Takabe, T. 2006. Abiotic Stress Tolerance in Plants-Toward the Improvement of Global Environment and Food. Springer, Netherlands. 5. Review articles and all related publications 			
Number of lectures:			Other Classes
Lectures: 10	Practices: 4	Other forms of teaching:	
Student research work: 6			
Teaching methods: Theoretical interactive classes, video and internet presentations, seminars, symposiums, field experiments			
Score for grading (maximal 100 points) Oral and written exams, project presentations, seminars			
Pre-commitments	Poens	The final exam	Poens
Activity during lectures	10	Written exam	20
Practical classes	30	Oral examination	20
Colloquia			
Seminars	20		
<i>Total</i>	60		40