

Study Programme : BSc in Ecology			
Degree level: Bachelor degree			
Course Title: Basics of plant physiology			
Professor: dr Slobodanka Pajević			
Required/Elective Course: Required Course			
Number of ECTS: 6			
Prerequisites: Biochemistry Course			
Course Objective: Students will be acquainted with basic biochemical and physiological processes during plant growth and development in order to understand plants role in primary production of organic matter			
Course Outcome: Upon completion of this course students will be able to understand the major functions and processes occurring in plants. These processes have both theoretical and practical value. Students will become acquainted with plant metabolism (photosynthesis, respiration, mineral nutrition), water relations, gas exchange, physiology of growth and development, and plant responses to environmental stress. Furthermore, students will be able to describe and use the basic techniques for studying plant physiology. In this course, special attention has been payed on plant cultivation methods under artificial conditions for both scientific and commercial use. Students will be able to discuss some practical applications of plant physiological research.			
Course Content:			
<i>Theoretical part:</i> Cell organelles and their role in metabolism. Water relations. Transpiration. Mechanism of stomata movement. Mineral nutrition. Uptake of ions by roots. Passive transport. Active transport. Transport of ions and organic molecules in phloem and xylem, remobilisation and retranslocation. Photosynthesis. Photosynthetic pigments. Molecular structure of thylakoids. Light and dark reactions in photosynthesis. Specificity of photosynthesis in some plant types. Synthesis and degradation of starch, transport of sucrose through phloem. Photorespiration. Glycolysis, Krebs cycle, respiratory chain and energy budget of respiration. Morphogenesis, growth and differentiation. Auxins, gibberellins, cytokinins, ethylene, ABA. Herbicides. Phytochrom system. Induced and autonomic movements. Senescence. Abscission. Pollination and fertilization. Incompatibility. Physiology of seed formation, appearance of embryo, endosperm and seed coat. Chemical composition and dormancy of seeds. Seed germination. Vegetative propagation, in vitro cultivation of plant cells, tissues and organs, application in biotechnology. Plant tolerance and adaptation to environmental stress.			
<i>Practical part</i>			
Osmotic potential of plant cells. Water potential. Transpiration. Water deficit. Leaf area. Plant cultivation under controlled conditions. Content of organic and mineral matter in dry plant material. Concentration of nitrogen, potassium, calcium and phosphorus. Activity of nitrate reductase, amylase and urease. Proline. Photosynthetic pigments and their identification by paper chromatography. Area and volumen of roots. Permeability of biomembranes. Respiration.			
Reading List:			
1. Arsenijević-Maksimović, I., Pajević, S. (2002): Praktikum iz fiziologije biljaka. Poljoprivredni fakultet, Prirodno-matematički fakultet, Novi Sad.			
2. Kastori, R. (1998): Fiziologija biljaka. Feljton, Novi Sad.			
3. Oljača, R., Krstić, B., Pajević, S. (2006): Fiziologija biljaka. Univerzitet u Banjoj Luci, Šumarski fakultet, Banja Luka.			
4. Stanković, Ž., Petrović, M., Krstić, B., Erić, Ž. (2006): Fiziologija biljaka. Prirodno-matematički fakultet, Departman za biologiju i ekologiju, Novi Sad, Novi Sad.			
5. Buchanan, B.B., Gruissem, W., Jones, R.L. (2002): Biochemistry & molecular biology of plants. American Society of Plant Physiologists, John Wiley & Sons.			
Total hours:			
Lectures: 3	Practicals:	Other:3	Student research work:
Methods of instruction: Lectures and lab work			
Assessment (maximum number of points 100)			
Requirements	points	Final exam	points
Active participation in lectures	3	Practical exam	35
Active participation in practicals	5	Oral exam	
Test(s) or	57		
Pre-exam testing			