

Study Programme: BSc in Biology
Degree level: First cycle (Bachelor)
Course Title: PLANT PHYSIOLOGY
Professor: Slobodanka Pajević, Milan Borišev
Required/Elective Course: required
Number of ECTS: 7
Prerequisites:
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, and 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 paid 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 volume of roots. Permeability of biomembranes. Respiration.
Reading List: Stanković, Ž., Petrović, M., Krstić, B., Erić, Ž. (2006): Fiziologija biljaka. Prirodno-matematički fakultet, Departman za biologiju i ekologiju, Novi Sad (Ed.). SIMBOL Novi Sad, s. 428. Oljača R., Krstić, B., Pajević, S. (2006): Fiziologija biljaka. Univerzitet u Banjoj Luci, Šumarski fakultet (Ed.), Art Print, Banja Luka, s. 264. Kastori, R. (1998): Fiziologija biljaka. Feljton, Novi Sad. Buchanan, B.B., Gruissem, W., Jones, R.L. (2002): Biochemistry & molecular biology of plants. American Society of Plant Physiologists, John Wiley & Sons, ISBN 0943088399 Arsenijević-Maksimović, I., Pajević, S. (2002): Praktikum iz fiziologije biljaka, Poljoprivredni fakultet, Prirodno-matematički fakultet, Novi Sad, s. 240. References in English.