



УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ
UNIVERSITY OF BANJA LUKA
ПРИРОДНО-МАТЕМАТИЧКИ ФАКУЛТЕТ
FACULTY OF NATURAL SCIENCES AND MATHEMATICS



CHEMISTRY DEPARTMENT

PhD STUDIES

Course name	Selected Topics in Biochemistry of Plants			
Course code	Course status	Semester	Hours of instruction	ECTS
DHEM23OPB	elective	I, II, III or IV	5+0	10
Teacher(s)	Prof. Biljana Kukavica, PhD			

Prerequisite course(s)	Entry requirements
none	/

Course goals
The course will provide an overview of important metabolic processes in plants and the mutual interactions of metabolic processes. The aim of the course is to get to know the metabolic processes of plants, their role in the growth and development of plants, and adaptation in response to changes in the environment.

Learning outcomes
Specificities of plant cell metabolic pathways and adaptation in the metabolism of plants as sessile organisms to changes in the environment. Students will acquire knowledge about plant proteins, metabolites, and biochemical mechanisms of adaptation to different types of abiotic stress.

Course content
Thematic topics
1. Structure and function of a plant cell - organelles characteristic of a plant cell.
2. Photosynthesis. Light phase: receptors, photosystem I and II, electron transfer. Dark phase: assimilation of CO₂, C₃, C₄, and CAM metabolism and regulation of photosynthesis.
3. Sugar metabolism (biosynthesis and breakdown of sucrose and starch)
4. Nucleic acids (DNA synthesis, transcription, translation)
5. Amino acids (biosynthesis, conversion of inorganic N into transportable amino acids).
6. Lipids (function, biosynthesis, and catabolism of storage, membrane, and extracellular lipids)
7. Sulfur metabolism (assimilation, biosynthesis of cysteine, glutathione)
8. Aging and cell death (energy and oxidative metabolism during the aging process, the influence of the environment on the aging process)
9. Plant secondary metabolites (biosynthesis, function)
10. Response of plants to abiotic stress (drought, low temperatures, freezing, flooding, impact of pesticides, heavy metals, oxidative stress, and antioxidant metabolism)
11. The lecture program can be coordinated with the student's research areas.

Teaching methods
Lectures, review of relevant literature

Books and other learning materials
Buchanan, B. B., Gruissem, W., & Jones, R. L. (Eds.). (2015). *Biochemistry and molecular biology of plants*. John Wiley & Sons.

Course activities and grading method
Seminar work, Final oral exam

Seminar work	40	Final exam	60
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Additional course notes
none

Name of the teacher who prepared this form: Biljana Kukavica