

Faculty of Science and Mathematics / BIOLOGY / INSTRUMENTAL METHODS IN BIOLOGY

Course:	INSTRUMENTAL METHODS IN BIOLOGY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
10158	Mandatory	6	4	2+0+2
Programs	BIOLOGY			
Prerequisites	There are no requirements for registering and listening to the subject			
Aims	The course program is designed to enable students to acquire knowledge about instrumental methods in biology researches.			
Learning outcomes	TDescribe the basic working principles of the most commonly used instrumental methods in biological research; Explain the connection between the need for a certain type of result and the use of certain methods and instruments; Uses correctly and independently a certain method in solving of the counter-posed problem			
Lecturer / Teaching assistant	Svetlana Perović			
Methodology	Lectures and laboratory exercises. Learning, consultations, tests, colloquiums.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Laboratory equipment, standards and safety			
I week exercises	Separation of sugar mixture by chromatography on paper			
II week lectures	Theoretical bases of chromatographic methods. Adsorption chromatography. Partition chromatography. Chromatography with ion exchangers. Chromatography with molecular sieves.			
II week exercises	Separation of chloroplast pigments by paper chromatography			
III week lectures	Affinity chromatography. Chromatography on paper. Chromatography on a thin layer. Gas chromatography. High-pressure and liquid chromatography.			
III week exercises	Determination of pigments in phytoplankton dawns by HPLC method			
IV week lectures	Centrifugation.			
IV week exercises	Determination of metal content in biological material AAS			
V week lectures	Theoretical foundations of optical methods. Microscopy.			
V week exercises	Measurement of light absorption by blebs and respiratory cells pigments			
VI week lectures	Qualitative and quantitative determinations with the help of optical methods analysis.			
VI week exercises	Determination of permeability of yeast cells depending on temperature based on the release of sodium ions from the cells			
VII week lectures	Photoelectric photometry. Flame photometry.			
VII week exercises	Determining the number of cells in plant tissue			
VIII week lectures	Ultraviolet and visible spectrophotometry. Atomic absorption spectrophotometry.			
VIII week exercises	Determining the number of stoma by the slice method			
IX week lectures	COLLOQUIUM 1.			
IX week exercises	Determining the compensation point of carbon dioxide by measuring pH			
X week lectures	Theoretical foundations of electroanalytical methods. Potentiometry. Amperometry.			
X week exercises	Registration of cell potential			
XI week lectures	Radioisotope methods. The nature of radioactivity. Application radioisotope.			
XI week exercises	Examination of the intensity of photosynthesis and respiration			
XII week lectures	Theoretical basis of manometric methods. Types of manometry.			
XII week exercises	Examining the effect of inhibitors on the respiration rate of yeast cells			
XIII week lectures	Electrophoretic method in protein analysis (polyacryl-amide-gel electrophoresis, protein detection on gel)			
XIII week exercises	Determination of SH-group content by amperometric titration			

XIV week lectures	Radioimmunological analyses, ELISA tests for concentration detection biomolecules.					
XIV week exercises	Determining the intensity of photosynthesis and respiration by mammometry method					
XV week lectures	Application of manometric methods					
XV week exercises	Determination of oxygen capacity of blood and hemolymph					
Student workload						
Per week			Per semester			
4 credits x 40/30=5 hours and 20 minuts 2 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 1 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts Total workload for the subject: 4 x 30=120 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 24 hour(s) i 0 minuts Workload structure: 85 hour(s) i 20 minuts (cources), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, complete and certify all exercises, take tests and colloquiums			
Consultations			Wednesdays from 2-3 pm and by appointment.			
Literature			Marjanović, N. J., Krstić, B. (1998): Instrumentalne metode u biološkim istraživanjima. Tehnološki i Prirodno-matematički fakultet, Univerzitet u Novom Sadu, Novi Sad. Marjanović, N. J., Janković, I. (1983): Instrumentalne metode analize. Tehnološki fakultet, Novi Sad, Zavod za izdavanje udžbenika, Novi Sad Mišović, J., Ast, T. (1981): Instrumentalne metode hemijske analize. Tehnološko-metalurški fakultet, Beograd. Arsenijević-Maksimović, I., Pajević, S. (2002): Praktikum iz fiziologije biljaka, Poljoprivredni fakultet, Prirodno-matematički fakultet, Novi Sad, s. 240.			
Examination methods			- Test: 25 points - colloquium 25 points - Final exam: 50 points.			
Special remarks						
Comment			For additional information, contact the teacher. milojes@ucg.ac.me			
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points