

**Faculty of Metallurgy and Technology / ENVIRONMENTAL PROTECTION / BASIC ELEMENTS OF BIOCHEMISTRY AND BIOTECHNOLOGY**

<b>Course:</b>	BASIC ELEMENTS OF BIOCHEMISTRY AND BIOTECHNOLOGY			
<b>Course ID</b>	<b>Course status</b>	<b>Semester</b>	<b>ECTS credits</b>	<b>Lessons</b> (Lessons+Exercises+Laboratory)
10651	Mandatory	6	8	2+2+0
<b>Programs</b>	ENVIRONMENTAL PROTECTION			
<b>Prerequisites</b>	None			
<b>Aims</b>	For the student to gain basic knowledge of biochemistry and understand the impact on other natural sciences, especially biotechnology.			
<b>Learning outcomes</b>	Upon completion of this course, the student will be able to: - explain the structure and chemical properties of biomolecules - explain the relationship between the structure and the biological role of biomolecules - compare and explain the basic mechanisms of regulation of metabolic pathways - understand the basics of biotechnology - explain ethical principles and legal regulations in the field of biotechnology.			
<b>Lecturer / Teaching assistant</b>	Prof. dr Biljana Damjanović-Vratnica prof. dr Miljan Bigović			
<b>Methodology</b>	Lectures, exercises, seminar work. Consultations and colloquiums.			
<b>Plan and program of work</b>				
Preparing week	Preparation and registration of the semester			
I week lectures	Acquaintance of the student with the work plan, colloquiums, final exam. Introduction. Functional groups. Biochemical reactions.			
I week exercises	Introduction to types of biological macromolecules. Laboratory techniques of manipulation with biomacromolecules.			
II week lectures	Biomolecules. Biologically important organic compounds.			
II week exercises	Hydrolysis of disaccharides and polysaccharides.			
III week lectures	Biomacromolecules			
III week exercises	Protein isolation. Buffer properties of proteins and Isoelectric point.			
IV week lectures	Enzymes. Basic concepts of enzyme catalysis			
IV week exercises	Quantitative analysis of triglycerides. Acid, saponification and ester number.			
V week lectures	Vitamins. Hormones			
V week exercises	Laboratory test			
VI week lectures	Basics of metabolism and basic principles of bioenergetics. Catabolism and anabolism			
VI week exercises	The first colloquium			
VII week lectures	Carbohydrate metabolism (glycolysis). Krebs cycle			
VII week exercises	Remedial first colloquium			
VIII week lectures	Metabolism of lipids and amino acids			
VIII week exercises	Field exercises			
IX week lectures	History and division of biotechnology			
IX week exercises	Seminar papers			
X week lectures	Chemistry of life			
X week exercises	Seminar papers			
XI week lectures	Biotechnological processes. Bioreactors.			
XI week exercises	Seminar papers			
XII week lectures	The role and importance of biotechnology in environmental protection			
XII week exercises	Second colloquium			
XIII week lectures	Application of genetically modified organisms			

XIII week exercises	second colloquium.					
XIV week lectures	Safety, legal regulations and ethical issues					
XIV week exercises	Seminar papers					
XV week lectures	Biochemistry and biotechnology in industry					
XV week exercises	exercise compensation					
<b>Student workload</b>	in the semester Lessons and final exam: (6 hours and 20 minutes) x 16 = 101 hours and 20 minutes Necessary preparations (administration, registration, certification before the beginning of the semester): (6 hours and 20 minutes) x 2 = 12 hours and 40 minutes Total workload for the course: 5 x 30 = 150 hours Supplementary work: for exam preparation in the make-up exam period, including taking the make-up exam from 0 to 24 hours (remaining time from the first two items to the total workload for the course of 120 hours) Load structure: 101 hours and 20 minutes (teaching) + 12 hours and 40 minutes (preparation) + 36 hours (additional work).					
<b>Per week</b>			<b>Per semester</b>			
<b>8 credits x 40/30=10 hours and 40 minuts</b> 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises <b>6 hour(s) i 40 minuts</b> of independent work, including consultations			Classes and final exam: <b>10 hour(s) i 40 minuts x 16 =170 hour(s) i 40 minuts</b> Necessary preparation before the beginning of the semester (administration, registration, certification): <b>10 hour(s) i 40 minuts x 2 =21 hour(s) i 20 minuts</b> Total workload for the subject: <b>8 x 30=240 hour(s)</b> 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) <b>48 hour(s) i 0 minuts</b> Workload structure: <b>170 hour(s) i 40 minuts (courses), 21 hour(s) i 20 minuts (preparation), 48 hour(s) i 0 minuts (additional work)</b>			
<b>Student obligations</b>			Attending classes, defending the seminar paper, passing the colloquium and the final exam			
<b>Consultations</b>			after the lecture and by appointment			
<b>Literature</b>			S. Spasić eta al., Osnovi biohemije, Beograd, 2003; D. Voet, J. Voet, Wiley&Sons, New York, 1995; H-J. Jordening, J. Winter: Environmental biotechnology - concepts and applications; Wiley-VCH; 2005.; C. Ratledge, B. Kristiansen: Basic biotechnology, Cambridge University Press; 2006. ;			
<b>Examination methods</b>			Attendance at classes and exercises: 0 - 5 points; Laboratory test: 0-5 points Seminar work: 0-10 points; 1st colloquium: 0 - 15 points; II colloquium: 0 - 15 points. Final exam: 0 - 50 points; A passing grade is obtained if at least 50 points are accumulated cumulatively.			
<b>Special remarks</b>			/			
<b>Comment</b>			A student can take the final exam on the condition that he has completed and certified all the laboratory exercises provided for in the plan and program.			
<b>Grade:</b>	F	E	D	C	B	A
<b>Number of points</b>	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