

FACULTY OF CHEMISTRY					
SUBJECT CARD					
Name of subject in Polish:	Biochemia				
Name of subject in English:	Biochemistry				
Main field of study (if applicable):	Biotechnology				
Specialization (if applicable):					
Profile:	academic				
Level and form of studies:	1 st , full-time				
Kind of subject:	obligatory				
Subject code:					
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			60		
Number of hours of total student workload (CNPS)			90		
Form of crediting			crediting with grade		
For group of courses mark (X) final course					
Number of ECTS points			3		
including number of ECTS points for practical (P) classes			3		
including number of ECTS points for direct teacher-student contact (BU) classes			2,8		
PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES					
1. Basic knowledge of chemistry, biology and biochemistry					
2. The knowledge of the basic laboratory skills					
SUBJECT OBJECTIVES					
C1 Introduction to basic techniques of working with biomolecules					
C2. The basic skills for determining parameters describing the kinetics of enzymatic reactions					
SUBJECT LEARNING OUTCOMES					
relating to knowledge:					
PEK_W01 - knows the basic methods of biochemistry					
PEK_W02 - has knowledge about the techniques of protein separation (gel filtration, SDS-PAGE)					
PEK_W03 - has knowledge about determination of the protein concentration and determination of enzymatic activity					
relating to skills:					
PEK_U01 - can determine the concentration of protein (Lowry method, Bradford method, A280 measure)					
PEK_U02 - knows how to assess the nature of inhibition of enzymatic reaction (competitive inhibitor, non-competitive inhibitor, uncompetitive inhibitor)					
PEK_U03 - can perform chromatographic separation of proteins, gel filtration technique; choose the right gel;					

determine the void volume, and K_{av} PEK_U04 - can use SDS-PAGE as a method that separates protein by size PEK_U05 - knows how to isolate DNA from animal tissue, and how determine the purity of the product, melting point and the degree of renaturation PEK_U06 - can determine basic properties of the protein: pI, molecular weight, optimum pH and temperature, the amount of sulfhydryl and disulfide bridges		
Laboratory		Number of hours
Lab 1	Introduction, safety rules, pipetting, laboratory equipment (spectrophotometer, centrifuge, pH-meter, thermoblock)	4
Lab 2	Enzyme kinetics I	4
Lab 3	Enzyme kinetics II	4
Lab 4	Ellman's method for determination of thiol groups	4
Lab 5	The determination of disulfide bonds	4
Lab 6	Enzymatic hydrolysis	4
Lab 7	Gel filtration	4
Lab 8	Effect of temperature on enzyme activity	4
Lab 9	Effect of pH on enzyme activity	4
Lab 10	DNA preparation	4
Lab 11	pH titration of amino acids and protein	4
Lab 12	Protein SDS-PAGE electrophoresis	4
Lab 13	DNA melting curve	4
Lab 14	Application of absorption and emission spectroscopy in biochemical tests	4
Lab 15	Additional term, final test	4
	Total hours	60
TEACHING TOOLS USED		
N1. introduction to the experiment N2. Multimedia presentation N3. Calculations, problem solving N3. Instructions available on the E-portal platform N4. Scientific publication available on the E-portal platform		
EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation (F – forming (during semester), P – concluding (at semester end))	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEK_W01 – PEK_U06	Short question quizzes and/or final test (according to teacher instructions presented during introduction laboratory)
F2	PEK_U01 – PEK_WU036	Laboratory reports
F3		
P = 3,0 if (F1+F2+F3) = 60,0 – 70,0 pts. 3,5 if (F1+F2+F3) = 70,1 – 75,0 pts. 4,0 if (F1+F2+F3) = 75,1 – 80,0 pts. 4,5 if (F1+F2+F3) = 80,1 – 85,0 pts. 5,0 if (F1+F2+F3) = 85,1 – 90,0 pts. 5,5 if (F1+F2+F3) = 90,1 – 100,0 pts.		
PRIMARY AND SECONDARY LITERATURE		

PRIMARY LITERATURE:

- [1] Laboratory manuals available on the course-specific website only to qualified students (e-portal PWr).
- [2] Set of the original papers (e-portal PWr)

SECONDARY LITERATURE:

- [1] Jeremy M. Berg, Lubert Stryer, John L. Tymoczko, Gregory J. Gatto; BIOCHEMIA, PWN 2018
- [2] Lubert Stryer, Jeremy M. Berg, John L. Tymoczko, Gregory J. Gatto, Jr. BIOCHEMISTRY Ninth Edition 2019
- [3] Voet, D., Voet, J.G. „Biochemistry” Wiley & Sons, Inc., 3rd edition.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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