

Faculty of Chemistry					
SUBJECT CARD					
Name of subject in English:	<b>Bioprocess Project</b>				
Main field of study (if applicable):	<b>Biotechnology</b>				
Specialization (if applicable):	Bioinformatics				
Profile:	academic				
Level and form of studies:	2nd level, full-time				
Kind of subject:	obligatory				
Subject code:	BTC024015				
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)				30	
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 (BK) classes				1	
PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES					
1. Knowledge of mathematics and mass transfer phenomena on a bachelor level (chemical engineering or related field), and basics of chemical reactor engineering					
SUBJECT OBJECTIVES					
C1 To provide a student with an ability to carry out literature research in the field of a specific scientific and research problem, primarily using the available databases. (K2Abt_U01)					
C2 To provide a student with an ability to acquire, critically evaluate and creatively process information from scientific literature, databases and other properly selected sources, including in English language. (K2Abt_U04)					
C3 To provide student with an ability to work individually or in pairs					
SUBJECT EDUCATIONAL EFFECTS					
<b>related to knowledge:</b>					
PEK2Abt_W01 student has advanced knowledge of mathematics allowing for understanding, quantitative description and / or modeling of chemical and / or biotechnological processes.					
PEK2Abt_W03 student knows the principles of formulating hypotheses, building models and formulating theories in the context of the concept of biotechnology development.					
PEK2Abt_W07 student knows and understands the facts, objects and phenomena in the field of biotechnology and related sciences as well as their methods and theories explaining the complex relationships between them.					
<b>related to skills:</b>					
PEK2Abt_U01 student is able to carry out literature research in the field of a specific scientific and research problem, primarily using the available databases.					
PEK2Abt_U04 student is able to acquire, critically evaluate and creatively process information from scientific literature, databases and other properly selected sources, including in English language.					
<b>related to social competences:</b>					
PEK2Abt_K01 student is ready to critically evaluate his/her knowledge and received content.					
PEK2Abt_K03 student is aware of the need to act for the public interest.					

PROGRAMME CONTENT		
Project		Number of hours
Proj 1	Introductory lecture – Bioprocess engineering; Engineering rules in a bioprocess design and selection of production and separation processes; Selection of equipment; Example	2
Proj 2	Scientific and patent literature survey, and selection of a biotechnology process	6
Proj 3	Collecting the data related to the process, reaction kinetics data, scale-up data, separation and purification processes data, data related to equipment, new research trends related to the topic	6
Proj 4	Process design - selection of bioreactor type and separation processes, as well as sequence of the processes/equipment	4
Proj 5	Detailed material balancing of the process for the selected capacity	6
Proj 6	Detailed design of three units from the selected equipment	4
Proj 7	Project presentation	2
	Total hours	30
TEACHING TOOLS USED		
N1. Multimedia presentation N2. Computer/ Scientific and patent literature databases search N3. Solving tasks N4. Computer / Excel, Polymath or Matlab		
EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F	PEK2Abt_W01, PEK2Abt_W03, PEK2Abt_W07	Discussion on each step of the project (Proj 2-6)
P	PEK2Abt_W01, PEK2Abt_W03, PEK2Abt_W07	Project presentation (Proj 7)
PRIMARY AND SECONDARY LITERATURE		
<b><u>PRIMARY LITERATURE:</u></b> [1] Bioseparations Science and Engineering (2nd Edition) Authored by: Roger G. Harrison, Paul W. Todd, Scott R. Rudge and Demetri P. Petrides. Oxford University Press (2015) [2] S. Liu, Bioprocess Engineering 2nd Edition, Elsevier (2016)		
<b><u>SECONDARY LITERATURE:</u></b> [1] S. Ricardo, S.K. Sudhir, Chemical and Bioprocess Engineering, Springer (2013)		
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)		
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