

Course Unit Descriptor

Study Programme: Biotechnology, Pharmaceutical engineering			
Course Unit Title: Bioprocess Kinetics			
Course Unit Code: DB5			
Name of Lecturer(s): Associate Professor Damjan Vučurović, Associate Professor Bojana Bajić			
Type and Level of Studies: Doctoral Academic Degree			
Course Status (compulsory/elective): Elective			
Semester (winter/summer): Winter/summer			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 10			
Prerequisites: None			
Course Aims: Acquisition of scientific abilities and academic skills in the field of bioprocess kinetics, with a more detailed understanding of the laws and phenomena of microbial growth kinetics.			
Learning Outcomes: Students' competence for independent scientific work on solving practical and theoretical problems in the field of bioprocess kinetics, or more detailed understanding of the kinetics of specific bioprocesses.			
Syllabus: <i>Theory</i> Kinetic models of growth for microorganism cultures. Induction period - lag phase of microorganism growth. Exponential growth phase of microorganisms. Inhibition of growth by microorganism with excess substrate. Inhibition of growth of microorganisms by bioprocess products. Growth of microorganisms in the chemostatic regime. Kinetics of growth of filamentous fungi. <i>Practice</i> Searching through scientific literature, processing, analysis and discussion of the latest knowledge in this field.			
Required Reading: 1. Shijie Liu: Bioprocess Engineering: Kinetics, Biosystems, Sustainability and Reactor Design, Elsevier, Oxford, 2013. 2. Elmar Heinzle, Arno P. Biber, Charles L. Cooney: Development of Sustainable Bioprocesses: Modeling and Assessment, John Wiley & Sons, West Sussex, 2006. 3. Urmila Diwekar: Batch Processing: Modeling and Design, CRC Press, Taylor & Francis Group, Boca Raton, 2014. 4. Tapobrata Panda: Bioreactors: Analysis and Design, Tata Mc Graw Hill Education Private Limited, New Delhi, 2011.			
Weekly Contact Hours: 6	Lectures: 4	Practical work: 2	
Teaching Methods: Interactive lectures and consultations in a group or independently depending on the number of students; computer work, use of the internet, creation and presentation of seminar.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	Final exam	points
Active class participation		written exam	

Practical work		oral exam	50
Preliminary exam(s)		
Seminar(s)	50		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			