Course Syllabus

I. General Information

Course name	Physical chemistry
Programme	Biotechnology
Level of studies (BA, BSc, MA, MSc, long-cycle	BSc
MA)	
Form of studies (full-time, part-time)	part-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator/person responsible dr Ludomir Kwietniewski

Type of class (use only	Number of teaching	Semester	ECTS Points
the types mentioned	hours		
below)			
lecture	30	П	6
tutorial			
classes	30	П	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language			
classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites Basics of chemistry, physics and mathematics

II. Course Objectives

To gain a knowledge of the general principles of thermodynamics, electromagnetic properties of molecules, theories of adsorption, chemical kinetics, rate laws for chemical reactions and reaction mechanisms.

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		danger	

III. Course learning outcomes with reference to programme learning outcomes

IV. Course Content

First Law of Thermodynamics. Thermodynamic functions. Hess's law and Kirchhoff's law. Second Law of Thermodynamics. Entropy in irreversible processes.

Molecules in electric, magnetic and electromagnetic fields. Dipole moments. Electrical double layer. Classification of electricity conductors. Electrolytes and their properties.

Theoretical ground of kinetics.Rate of chemical reactions. Kinetic equations. Orders of chemical

reactions. Activation energy. Catalysis – homo- and heterogeneous. Partition of substances between two phases. Homo- and heterogeneous solid surfaces. Physical and chemical adsorption. Adsorptive surface layers. Theories and isotherms of adsorption.

Symbol	Didactic methods	Forms of assessment	Documentation type
	(choose from the list)	(choose from the list)	(choose from the list)
		KNOWLEDGE	
W_01	Conventional lecture	Exam	Rated text of the written
			work
W_02	Laboratory classes	Colloquium/test/written test	Completed and evaluated
			colloquium/test/written
			test
W_03	Laboratory classes	Observation	Evaluation card
		SKILLS	
U_01	Laboratory classes	Report	Print / Report file
U_02	Laboratory classes	ReportPrint / Report file	Print / Report file
	Conventional lecture	Exam	Rated text of the written
			work
U_03	Laboratory classes	Report	Print / Report file
U_04	Laboratory classes	Report	Print / Report file
U_05	Laboratory classes	Report	Print / Report file
U_06	Laboratory classes	Report	Print / Report file
U_07	Laboratory classes	Report	Print / Report file
U_08	Laboratory classes	Colloquium/test/written test	Completed and evaluated
	Conventional lecture	Exam	colloquium/test/written
			test
			Rated text of the written
			work
	SC	CIAL COMPETENCIES	
K_01	Laboratory classes	Observation	Evaluation card

V. Didactic methods used and forms of assessment of learning outcomes

VI. Grading criteria, weighting factors.....

Lecture: Grade from the written exam (100 %).

Classes: Written tests in the form of colloquia and / or tests on issues from the main chapters (80%), preparation of written reports on the classes (8%), assessment of student's activity during classes (theoretical preparation for classes, practical exercises, activity, ability to work in a group, compliance with health and safety rules, 12%).

Mark	Evaluation criteria	
verygood (5)	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 91-100%

overgood (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 86-90 %
good(4)	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 71-85%
quitegood(3.5)	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 66-70%
sufficient (3)	the student accomplishes the assumed learning outcomes at a sufficientlevel	the student demonstrates knowledge of the education content at the level of 51-65%
insufficient (2)	the student accomplishes the assumed learning outcomes at an insufficientlevel	the student demonstrates knowledge of the education content below the level of 51%

VII. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	60
Number of hours of individual student work	90

VIII. Literature

Basic literature
P. Atkins. The Elements of Physical Chemistry, 6th edition. Oxford University Press, 2013.
P. Atkins, J. De Paula. Physical Chemistry for Life Science, 2nd edition. Oxford University Press,
2010.
Additional literature
C. Trapp, M. Caddy. Solutions Manual to accompany Physical Chemistry for the Life Sciences. Oxford
University Press. 2011