COURSE DESCRIPTION (SYLLABUS)

1.	Course: **Introduction to Biochemical Calculations**
2.	Language of instruction: **English**
3.	Faculty: **Faculty of Biotechnology**
4.	Course/module code: **29-BT-S1-E1-EnIBCc**
5.	Course/module type (*mandatory* or *elective*): **mandatory**
6.	Programme: **Biotechnology**
7.	Study cycle (*1st/2nd*): **1st cycle**
8.	Year: **1st**
9.	Semester *(autumn* or *spring):* **autumn**
10.	Form of tuition and number of hours: Tutorial: **30 h**
11.	Coordinator: **Agata Szalewicz, PhD**
12.	Initial requirements *(knowledge, skills, social competences):* **Knowledge of chemistry on a secondary school level, especially concerning stoichiometry of chemical reactions, reactions in solutions and description of solutions concentration, together with ability to solve calculative problems concerning areas mentioned above.** **In addition, mathematical calculative skills concerning finding solution of the quadratic equation, knowledge of exponential and logarithmic functions are required.**
13.	Objectives: **Students are intended to gain calculating skills indispensable for their further proper work in laboratory and experimental data analysis.**
14.	Content: • **SI unit system: multiples and fractions of units;** • **Calculations based on stoichiometry with the use of basic definitions (mass, volume, density, mole, molar volume of a gas);** • **Solutions: modes of expressing solution concentrations, solution preparation (from**

<table>
<tr><td></td><td colspan="2">a solid state substances; from a concentrated solutions, mixing and diluting solutions);
• Reactions and ionic equilibria in aqueous solutions:
• dissociation: Electrolytes: strong acids and bases, weak acids and bases: Dissociation constant, degree of dissociation, Water ionization constant (K_w);
• pH, pOH of strong and weak electrolytes solutions, neutralization reaction of strong acids and bases.</td></tr>
<tr><td>15.</td><td>Learning outcomes:

Student:
• is able to make calculations with the use of basic definitions from the field of general and analytical chemistry;
• understands and properly uses different definitions of solutions concentration; is able to make calculations and prepare solutions for their laboratory work;
• understands and is able to quantitatively describe the reactions and ionic equilibria in aqueous solutions;
• reads and understands scientific literature in the field of general and analytical chemistry;
• learns a given subject by himself from the indicated literature or from other resources (also available online);
• uses scientific language from the field of general and analytical chemistry in discussions about calculational problems;
• understands the need for careful theoretical planning and preparing for scientific experiments.</td><td>Outcome symbols:

K1_W02, K1_W04, K1_U03, K1_U04, K1_U09, K1_U12, K1_K01, K1_K03</td></tr>
<tr><td>16.</td><td colspan="2">Recommended literature:
• Gary D.Christian, Purnendu K. Dasgupta, Kevin A Schug „Analytical Chemistry” Wiley, Seventh Edition, 2014.
• Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch „Skoog and West’s Fundamentals of Analytical Chemistry”. 9th Edition, CENGAGE Learning, 2014.
• Kris Moorthy: „Fundamentals of Biochemical Calculations” CRC Press, 2008.</td></tr>
<tr><td>17.</td><td colspan="2">Methods of verification of the assumed learning outcomes:
Tests (written form) performed after each Section of the course
Individual student’s work (solving problems) at class.</td></tr>
<tr><td>18.</td><td colspan="2">Conditions of earning credits:
• completing the course (Passing all tests);
• the presence and active participation in class.</td></tr>
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19.	Student's workload:	
	Activity	Number of hours for the activity
	Hours of instruction (as stipulated in study programme) : • Tut.: **30 h** • Individual consultations: **10 h**	40 h
	Student's own work • preparation before class: **20 h** • preparing for tests: **20 h**	40 h
	Total number of hours:	**80 h**
	Number of ECTS	**3 ECTS**