

SUBJECT/COURSE SYLLABUS

1.	Course name in Polish and English Biotechnology of pharmaceuticals Biotechnologia farmaceutyczna
2.	Scientific discipline Medical sciences Biotechnology
3.	Language of instruction English
4.	Unit conducting the course Faculty of Biotechnology
5.	Type of course elective - choice limited to Bioengineering and Biotechnology of pharmaceuticals
6.	Field of study Biotechnology
7.	Level of study first-cycle
8.	Year of study 3rd
9.	Semester summer
10.	Course form and number of hours Laboratory, 15 h
11.	Prerequisites in terms of knowledge, skills and social competences for the course: Knowledge of the basics of analytical and physical chemistry, human physiology, cell and molecular biology , as well as the foundations of enzymology and biochemistry .
12.	Learning objectives for the course:

	<ul style="list-style-type: none"> • Familiarizing students with fundamental computational and practical problems in the fields of pharmacodynamics, pharmacokinetics (ADME), and bioavailability. • Utilizing the acquired knowledge to assess the stability of medicinal products. 	
13.	<p>Curriculum content:</p> <ul style="list-style-type: none"> • Basic pharmacokinetic concepts, including: absorption, distribution, elimination, clearance, volume of distribution, and half-life; • Application of fundamental pharmacokinetic equations to calculate key parameters such as elimination rate constant, half-life, clearance, and area under the curve (AUC); • Experimental determination of drug half-life using various analytical methods; • Comparison of different methods for determining half-life and critical evaluation of their assumptions, limitations, and sources of error; • Good laboratory practice, including: data recording, basic analytical techniques, and compliance with safety and quality standards; • Preparation of clear laboratory reports presenting pharmacokinetic calculations, experimental results, graphical analysis, and scientific discussion; • Developing problem-solving skills and quantitative reasoning related to pharmacokinetics and pharmaceutical sciences. 	
14.	<p>Description of learning outcomes</p> <p>Student:</p> <ul style="list-style-type: none"> • defines and explains key pharmacokinetic concepts (absorption, distribution, elimination) and parameters describing the fate of a drug in the body (clearance, volume of distribution, half-life); • identifies the theoretical foundations of analytical methods used to determine half-life; • critically evaluates various research methods, identifying their limitations, model assumptions, and potential sources of measurement error; • utilizes pharmacokinetic equations to calculate parameters such as AUC, elimination rate constant, and clearance based on experimental data; • conducts laboratory measurements to determine drug half-life and interprets the obtained results; • prepares a report containing correct data analysis, calculations, and interpretation of results; 	<p>Symbols for relevant directional learning outcomes:</p> <p>K1_W01</p> <p>K1_W09</p> <p>K1_U01</p> <p>K1_U08</p> <p>K1_U06</p> <p>K1_U05</p>

	<ul style="list-style-type: none"> knows and applies principles of laboratory practice (including accuracy and reliability in measurements and calculations) and safety standards for handling medicinal substances. 	K1_K06 K1_W10
15.	Mandatory literature: <ul style="list-style-type: none"> Laboratory manual provided by the instructors. Recommended literature: <ul style="list-style-type: none"> Enzymes, Robert A. Copeland Wiley -VCH 	
16.	Methods of verification of the assumed learning outcomes: <ul style="list-style-type: none"> ongoing assessment of laboratory performance written final test written laboratory report 	
17.	Conditions and form of credit for individual components of the course: <ul style="list-style-type: none"> minimum passing requirements: positive evaluation of the final test and report 	
18.	Student workload expressed in teaching hours and ECTS credits	number of hours allocated for the course of a given type of classes
	classes (according to the study plan) with the instructor: <ul style="list-style-type: none"> practical and laboratory classes 	15 h
	student's own work (including participation in group work) e.g.: <ul style="list-style-type: none"> reading the literature indicated; preparation for the final test. 	10 h
	Total number of class hours:	25 h
	Number of ECTS credits:	1 ECTS