University of Gdańsk

Subject card

Subject name and code	Biotechnology in medicine - Therapies and medical technologies Fundaments (M05_B3), PG_00197678		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	academic	Assessment form	exam
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Grzegorz Stasiłojć	
	Teachers	dr Grzegorz Stasiłojć dr hab. Wojciech Śledź prof. dr hab. Marcin Okrój prof. dr hab. Jacek Bigda prof. dr hab. Bogdan Banecki prof. dr hab. Anna Żaczek dr Grzegorz Gołuński dr hab. Patrycja Koszałka	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	48.0	0.0	0.0	0.0	0.0	48
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	48	5.0	47.0	100

Subject objectives	
	Block 3's primary goal is to get students ready to comprehend the basic procedures that underpin medical biotechnology, with a focus on the function of medications and the use of contemporary research methods. Additionally, it seeks to provide students with the information they need to evaluate the moral implications of the advancement and use of biotechnology in medicine.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_W06] The graduate knows and understands basic knowledge in science and natural sciences necessary for understanding the phenomena and biological processes, particular cellular processes at the molecular level	With particular reference to novel drug development, gene therapies, and tissue engineering, the student demonstrates the ability to apply his understanding of science and the life sciences to the analysis and interpretation of biological effects at the molecular level. Student is qualified to discuss how drugs work, how stem cells aid in tissue repair, and how molecular diagnostic methods are used in medicine.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[BIOTECHL3_W09] The graduate knows and understands the basic concepts and terminology used in biological and medical sciences as well as concepts from related scientific disciplines	The student is comfortable with the terminology of molecular biology, pharmaceutics, genetics and statistics, accurately describing phenomena and processes related to drug action, stem cells, gene therapy and other biomedical issues. He has extensive terminological knowledge of biotechnology, covering concepts related to bioavailability, pharmacokinetics, proteomics, molecular diagnostics and the ethics of biomedical research.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[BIOTECHL3_K03] The graduate is willing to understand risks and dilemmas, including ethical dilemmas related to conducting scientific research and introducing advanced technologies using the achievements of biotechnology; understand and appreciate the importance of intellectual property; behave ethically.	The student identify important moral dilemmas pertaining to the advancement and use of biotechnology, such as: The risks associated with organism genetic modification Concerns about using animals in laboratories Problems relating to gene and cell therapy Intellectual property and patent issues pertaining to biotechnological discoveries The development of biotechnology in social and economic aspects Student examine how biotechnology research and applications may affect society, ethics, and the environment. The student assess different ethical viewpoints on contentious biotechnology issues.	[SK1] oral statement/conversation/ discussion [SK3] text preparation/written work [SK4] test/exam - oral or written
[BIOTECHL3_W07] The graduate knows and understands basic techniques and research tools used in biotechnology.	The student will acquire a solid theoretical foundation in medical biotechnology, including knowledge of modern research techniques, bioinformatics tools and principles of experimental design. Student will be able to apply this knowledge to analyze research problems and evaluate research results published in the scientific literature.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[BIOTECHL3_W01] The graduate knows and understands basic biological phenomena at the molecular level, he/she is familiar with their significance for biotechnology.	Students are able to use the knowledge they have learned to evaluate the effects of genetic changes and biotechnological treatments as well as analyze and interpret biological processes at the molecular and cellular level. He or she is capable of using a few contemporary research methods used in medical biotechnology, such as organizing and carrying out basic lab tests. He or she can also search, analyze, and critically assess experimental data and scholarly publications in the field of medical biotechnology.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report

Subject contents	• **F1. Fundamentals of drug knowledge** 1. Drugs and their forms 2. Bioavailability and pharmacokinetics of the drug substance 3. Generic drugs, bioequivalence • **F2. Methods and processes used in medical biotechnology** 1. Basic medical concepts. 2. Regulation of stem cell function. Stem cells in medical biotechnology. 3. Tissue engineering. 4. Pharmacogenetics and pharmacogenomics. 5. Molecular diagnostics and pharmacodiagnostics. 6. Proteomics. Identification of new therapeutic targets. 7. Search for new molecular targets - clinical trials. 8. Recombinant vaccines. 9. Antibodies in biotechnology and immunotherapy. 10. Genetic modifications of cells and organisms. 11. Basic concepts related to the use of laboratory animals in biotechnology and medicine. 12. Gene therapy. 13. Basic regulations. Ethical controversies surrounding medical biotechnology. • **F3. Application of selected methods of statistical analysis in biotechnology.** 1. Basic concepts. 2. Stages of statistical investigation. Descriptive statistics. 3. Formulation and verification of statistical hypotheses. 4. Selected issues of statistical inference 5. Parametric and nonparametric tests 6. Tests used to compare two samples and their non-parametric counterparts 7. One-way analysis of variance (ANOVA) and its nonparametric counterparts 8. Introduction to qualitative data analysis and interdependence of phenomena
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Integration exam	51.0%	40.0%
F1. Fundamentals of drug knowledge	0.0%	15.0%
F3. Application of selected methods of statistical analysis in biotechnology	0.0%	5.0%
F2. Methods and processes used in medical biotechnology	0.0%	40.0%

Recommended reading	
Basic literature	• Materials provided by the lecturer • Literature sources provided in the lecture materials • Małgorzata Sznitowska, Roman Kaliszan, Biopharmaceutics, Publisher: Edra Urban & Partner, 2013
Supplementary literature	• European Pharmacopoeia • International Conference on Harmonization (ICH) http://www.ich.org/ • Food & Drug Administration (FDA) - Generic Drugs http://www.fda.gov • Andrzej Balicki, Wieslaw Makać, Methods of statistical inference, UG Publishing House, Gdansk 2004 • Self-researched and selected materials on classes using library resources and electronic sources of information
eResources addresses	
Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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