University of Gdańsk

Subject card

Subject name and code	Molecular diagnostics , PG_00153607		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	academic	Assessment form	exam
Conducting unit	Laboratory of Photobiology and Molecular Diagnostics -> UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Magda Rybicka-Misiejko	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	0.0	30

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	30	5.0	40.0	75

Subject objectives

Practical aspects of molecular diagnostic techniques used in research and clinical laboratories will be presented. During the course, the methods' principles will be presented, supported by examples of specific analyses. The student will gain in-depth knowledge of:

- modern molecular diagnostics, modern technologies and their links with other scientific fields
- health and safety principles in a diagnostic laboratory
- hazards and limitations of working with potentially infectious clinical materials
- hazards associated with laboratory research and manipulation of DNA/RNA

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W01] The graduate has in-depth knowledge of complex biological phenomena at the molecular level and knows their importance for biotechnology, is able to analyze them in an interdisciplinary approach and assess their ethical, social and environmental implications.	Upon completion of the course, the student : Explains the molecular mechanisms underlying various biotechnology techniques. Analyses and interpret research findings in molecular biology and biotechnology. Understands the principles of developing diagnostic tests based on DNA/RNA analysis and gene expression.	[SW4] test/exam - oral or written
[BIOTECHMU2_W03] The graduate has in-depth, specialized knowledge of therapy and diagnostic methods of human diseases, including the mechanisms of action of selected drugs, immunotherapy, cellular and gene therapy, understanding the ethical, legal and social dilemmas involved and being able to evaluate them from the perspective of the patient's well-being and the public interest.	Upon completion of the course, the student Understands concepts of diagnostic procedures for human disease. Recognizes indications for specific diagnostic tests. Interprets the results of diagnostic tests in the context of disease. Understands the limitations of selected diagnoses.	[SW4] test/exam - oral or written
[BIOTECHMU2_W06] The graduate has in-depth knowledge and understands the risks associated with conducting laboratory works, including those resulting from working with infectious material, GMOs and GMMs.	Upon completion of the course, the student: Identifies hazards associated with laboratory testing of infectious materials, GMOs, and GMMs and take appropriate precautions. When performing laboratory tests involving infectious materials, GMOs, and GMMs, the student is able to comply with occupational health and safety regulations.	[SW4] test/exam - oral or written

Subject contents

The lecture will cover techniques based on nucleic acid analysis to characterize and identify pathogens of infectious diseases, genetic diseases, and cancer. In addition, the course includes information on current trends in the development of molecular diagnostics and its links with other scientific fields, particularly medicine and molecular biology. The lectures will highlight the practical aspect of molecular diagnostics in diagnosing and treating a specific patient (so-called personalized medicine). The lecture will provide information on commercial diagnostic solutions, hardware platforms, and technological solutions available on the market.

At the end of the course, the student takes a written exam, which consists of 3 groups of questions checking 3 expected learning outcomes. For each question, there is information about which learning outcome the question applies to. The student receives a partial grade for each group of questions. The final grade is the average of the partial grades. All partial grades must be positive. The condition for taking the exam is obtaining a positive grade in the subject Molecular Diagnostics (laboratory exercises). Students who obtain a very good grade in the subject of Molecular Diagnostics (laboratory exercises) may take an extra term of the exam. Unjustified failure to take the written or oral exam on the scheduled date is tantamount to receiving an unsatisfactory grade and losing the first exam.

Prerequisites and co-requisites

Formal requirements: Successful completion of laboratory exercises in Molecular Diagnostics

Preferably completion of the following courses: Genetic engineering methodology, Molecular biology methodology

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	BIOTECHMU2_W03	51.0%	40.0%
	BIOTECHMU2_W01	51.0%	40.0%
	BIOTECHMU2_W06	51.0%	20.0%
Recommended reading	Basic literature	1. Literature used during classes 2. Content provided by the lecturer 3. Słomski, R. (red.) Analiza DNA. Praktyka. Poznań: Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu. 2014 4. Bal J. Genetyka medyczna i Molekularna. PWN Warszawa 2017 5. Lewandowska Ronnegren A. Techniki laboratoryjne w Biologii Molekularnej. MedPh, Wrocław 2018 6. Buckingham, M.L., Flaws, L.: Molecular diagnostics: Fundamentals, Methods and Clinical Applications. 2019	
	Supplementary literature	Chang-Hui Shen Diagnostic Molecular Biology, 2nd edition (2023)	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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