

Subject card

Subject name and code	Molecular diagnostics , PG_00153607						
Field of study	Biotechnology						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	postgraduate 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 English		
Semester of study	1	ECTS credits			3.0		
Learning profile	academic	Assessment form					
Conducting unit	Zakład Fotobiologii i Diagnostyki Molekularnej -> Instytut Biotechnologii UG -> Intercollegiate Faculty of Biotechnology UG-MUG						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Magda Rybicka-Misiejko				
	Teachers		dr Magda Rybicka-Misiejko				
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						
	Additional information: Online classes						
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	<p>The fundamentals and 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 knowledge of:</p> <ul style="list-style-type: none"> • modern molecular diagnostics, modern technologies and their links with other scientific fields • basic 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 knows and understands complex biological phenomena at the molecular level, their importance for biotechnology	<p>Upon completion of the course, the student will:</p> <p>Explain the molecular mechanisms underlying various biotechnology techniques.</p> <p>Analyse and interpret research findings in molecular biology and biotechnology.</p> <p>Understand the principles of developing diagnostic tests based on DNA/RNA analysis and gene expression.</p>	[SW4] test/exam - oral or written
	[BIOTECHMU2_W06] The graduate knows and understands the risks associated with conducting laboratory works, including those resulting from working with infectious material, GMOs and GMMs	<p>Upon completion of the course, the student will:</p> <p>Identify hazards associated with laboratory testing of infectious materials, GMOs, and GMMs and take appropriate precautions.</p> <p>When performing laboratory tests involving infectious materials, GMOs, and GMMs, be able to comply with occupational health and safety regulations.</p>	[SW4] test/exam - oral or written
	[BIOTECHMU2_W03] The graduate knows and understands general concepts of therapy and diagnostic methods of human diseases, including the mechanisms of action of selected drugs, immunotherapy and gene therapy	<p>Upon completion of the course, the student will:</p> <p>Understand general concepts of diagnostic procedures for human disease.</p> <p>Recognize indications for specific diagnostic tests.</p> <p>Interpret the results of diagnostic tests in the context of disease.</p> <p>Understand the limitations of selected diagnoses.</p>	[SW4] test/exam - oral or written
Subject contents	<p>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.</p> <p>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.</p>		
Prerequisites and co-requisites	<p>Formal requirements: Successful completion of laboratory exercises in Molecular Diagnostics</p> <p>Preferably completion of the following courses: Genetic engineering methodology, Molecular biology methodology</p>		

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	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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