University of Gdańsk

Subject card

Subject name and code	Molecular diagnostics (lab.), PG_00153606						
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 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	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
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	0.0	0.0	30.0	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		15.0	50
Subject objectives	To familiarize students with the techniques and tools used in DNA/RNA analysis. During the course, the student will be able to plan an experiment, i.e. organize space and work time. The student will learn to perform experiments independently and to document the steps performed during the experiments and the results obtained. The student will acquire the ability to use complex research techniques (e.g. real-time qPCR), and the ability to operate equipment used for the detection of genetic material and data analysis lLight Cycler, Nanodrop).						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHMU2_K02] The graduate possesses competences to collaborate in the implementation of research work and work in a team.	The student communicates effectively with research team members, expressing ideas clearly and listening actively to others. The student demonstrates responsibility for assigned tasks in the experiment and contributes to the achievement of common goals. The student actively participates in brainstorming and other forms of creative problem-solving in a team/ group. The student effectively manages time and resources in assigned research tasks within molecular diagnostics.. The student critically analyzes and evaluates the results of his/her research and that of other team/ group members, contributing to improving the quality of the work.	[SK5] implementation of a problem task [SK8] observation of student's independent or team work
	[BIOTECHMU2_U01] The graduate possesses the skills necessary to design and conduct laboratory research, critically assessing risks, method limitations, and ethical implications of undertaken activities.	Upon completion of the course, the student: 1. Demonstrates the skills necessary to work effectively in a laboratory environment. 2. Independently plans and conducts scientific experiments within molecular diagnostics, taking into account available resources and time constraints. 3. Reliably documents the progress of experiments and the results obtained, using appropriate methods and tools. 4. Uses in-depth techniques and research tools of molecular diagnostics in laboratory work under the supervision of a supervisor. 5. Efficiently operates specialized laboratory equipment and understands the principles of its operation and maintenance. 6. Adheres to health and safety rules in the diagnostic laboratory, demonstrating responsibility for self and co-workers. 7. Identifies, understands, and responds appropriately to potential hazards associated with working in a laboratory environment.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU3] text preparation/written work [SU5] implementation of a problem task [SU6] demonstration of practical skills
	[BIOTECHMU2_K05] The graduate complies with occupational health and safety rules, especially when working in the laboratory; is responsible for his/her own safety and the safety of others; is able to react to hazards.	Upon completion of the course, the student: Complies with occupational health and safety regulations with special emphasis on the diagnostic laboratory environment, demonstrates responsibility for the safety of self and co-workers, and is able to respond appropriately to hazardous situations.	[SK4] test/exam - oral or written [SK5] implementation of a problem task [SK8] observation of student's independent or team work
	[BIOTECHMU2_U02] The graduate is able to collect and interpret empirical data; use statistical methods and IT tools in data analysis; formulate conclusions based on empirical data.	Upon course completion, students can independently collect, analyze, and interpret empirical data from molecular diagnostics using appropriate statistical methods and IT tools, and formulate conclusions based on the results.	[SU2] presentation/project/paper/ report [SU3] text preparation/written work

Subject contents	The laboratory curriculum includes deepening knowledge of molecular biology techniques used in analysis-based diagnostics of genetic material (human, microbiological). In addition, laboratory exercises include knowledge of assessing the quality of material, genetic material, and its suitability for specific analyses. An important element of the exercises is learning to work under sterile conditions and the ability to organize workspace and time.
Prerequisites and co-requisites	**Formal requirements** Preferred knowledge, skills and competences acquired during laboratory exercises in General Microbiology, Molecular Biology

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Activity and teamwork skills	51.0%	7.5%
Report	51.0%	25.0%
Health and safety rules	51.0%	7.5%
Test	51.0%	60.0%

Recommended reading

Basic literature	1. Treści udostępnione przez prowadzącego wykłady DIagnostyka molekularna. 2. Słomski, R. (red.) Analiza DNA. Praktyka. Poznań: Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu, 2014 3. Bal J. Genetyka medyczna i Molekularna. PWN Warszawa 2017 4. Lewandowska Ronnegren A. Techniki laboratoryjne w Biologii Molekularnej. MedPh, Wrocław 2018
Supplementary literature	Buckingham, M.L., Flaws, L.: Molecular diagnostics: Fundamentals, Methods and Clinical Applications. 2019
eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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