University of Gdańsk

Subject card

Subject name and code	Molecular Taxonomy of Marine Organisms - laboratory , PG_00204909						
Field of study	Oceanography						
Date of commencement of studies	October 2027		Academic year of realisation of subject		2027/2028		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group 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	Department of Marine Ecosystems Functioning -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Filip Pniewski				
	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		2.0		18.0	50
Subject objectives	Preparing students to use modern molecular methods in the study of evolution and taxonomy of organisms marine. To lay the foundation for critical inference on the usefulness of these methods and skillful evaluation and interpretation of the obtained results [form of classes: laboratory and auditory exercises].						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OCEANMU2-K05] is ready to follow the rules occupational health and safety, taking care of the entrusted person specialized and recognition equipment emergency situations and take appropriate action activities	Is ready to follow the rules of safety and hygiene at work in the molecular biology laboratory, take care of the specialized equipment entrusted to him, and recognize hazardous situations when working with reagents and equipment used in the study of the phylogenetics of marine organisms (curriculum content: 1)	[SK8] observation of student's independent or team work
[OCEANMU2-U04] is ready to develop in an analytical and synthetic way research and analysis results and based on them creating conclusions	Can analytically and synthetically elaborate the results of phylogenetic research and analysis and, on the basis of them, make correct inferences on the evolution and relatedness of marine organisms (curriculum content: 1-4)	[SU2] presentation/project/paper/ report
[OCEANMU2-U03] can plan and carry out independently advanced research and measurements, both in field and laboratory, using appropriately selected measurement and analytical techniques in the field of oceanography, adequately to the studied specialty and research problem	Student can independently plan research and laboratory analyses in the field of marine organism phylogenetics (curriculum content: 1-4)	[SU1] oral statement/conversation/ discussion
[OCEANMU2-W04] has an in-depth understanding of the latest research trends in oceanography, as well as the possibilities for practical application of related achievements; evaluates their usefulness and limitations in solving scientific research problems, and critically analyzes and assesses their applicability	Knows and understands to an in-depth degree the techniques, research methods and tools (mathematical, statistical, computer) used to describe the evolution and relatedness of marine organisms (curriculum content: 1-4)	[SW4] test/exam - oral or written

Subject contents

1. Basic molecular techniques in phylogenetic studies: DNA isolation, agarose gel electrophoresis, PCR, purification of PCR products.
2 Sequencing - classical sequencing, next-generation sequencing.
3 Application of bioinformatics tools in phylogenetic research: preparation of sequences for phylogenetic analyses, familiarization of students with molecular databases, selection of sequences depending on the purpose of the research task and preparation of sequence matching, plotting phylogenetic trees using various computer programs, estimation of the reliability of the obtained trees, interpretation of the obtained OUTs, molecular clock.
4. Independent reconstruction of the phylogeny of a selected group of organisms using the knowledge gained in the course and comparison of the obtained results with literature data

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written report	51.0%	15.0%
written test (3x, 25 min)	51.0%	75.0%
Observation of independent work of a student	51.0%	10.0%

Recommended reading

Basic literature

1. Brodie J., Lewis J. 2007. Unravelling the algae. The past, present, and future of algal systematics. The Systematics Associa-tion special Volume
Series 75. CRC Press. Boca Raton.
2. Hall B.G. 2008. Łatwe drzewa filogenetyczne. Poradnik użytkownika. Wydawnictwo Uniwersytetu Warszawskiego. Warszawa.
3. Higgs P.G., Attwood T.K. 2008. Bioinformatyka i ewolucja molekularna. Wydawnictwo Naukowe PWN. Warszawa.
4. Jura C. 1997. Bezkręgowce. Wydawnictwo Naukowe PWN. Warszawa.
5. Krawczyk B., Kur J. 2008. Diagnostyka molekularna w mikrobiologii. Wydawnictwo Politechniki Gdańskiej. Gdańsk.
6. Nowak Z., Gruszczyńska J. 2007. Wybrane techniki i metody analizy DNA. Wydawnictwo SGGW. Warszawa.
7. Szweykowska A., Szweykowski J. 2005. Botanika. Systematyka. Tom 2. Wydawnictwo Naukowe PWN. Warszawa.
8. Weiner J. 1999. Życie i ewolucja biosfery. Podręcznik ekologii ogólnej. Wydawnictwo Naukowe PWN. Warszawa.8. Węgleński P. (red.). 2003.
Genetyka molekularna. Wydawnictwo Naukowe PWN. Warszawa.

	Supplementary literature	1. Ansorge J.W. 2009. Next-generation DNA sequencing techniques. New Biotechnology. 25(4): 195-203. 2. Kircher M., Kelso J. 2010. High-throughput DNA sequencing concepts and limitations. Bioessays. 32: 524-536. 3. Spalik K., Piwczyński M. 2009. Rekonstrukcja filogenezy i wnioskowanie filogenetyczne w badaniach ewolucyjnych. Kosmos. Problemy nauk biologicznych. 58(3-4): 485-498.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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