University of Gdańsk

Subject card

Subject name and code	Molecular methods in species identification, PG_00198103		
Field of study	Natural Resources Conservation		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	1.0
Learning profile	academic	Assessment form	credit
Conducting unit	Faculty of Biology -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Magdalena Dudek	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	3.0	7.0	25

Subject objectives

1. To familiarize students with the problems of molecular research methods in taxonomy.

2. To introduce the issues of integrative taxonomy, cybertaxonomy, data repositories.

3. To learn the basic terminology, tools, and steps of data analysis in molecular taxonomy, as well as current methods of determining new taxonomic units.

4. To familiarize with the methods of identifying plant, animal and fungal species from biological material and environmental samples.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OZPL3_K02] The graduate is ready to work effectively in a team, taking on different roles within it	The student is able to work effectively in a team assuming various roles in it.	[SK4] test/exam - oral or written
[OZPL3_K08] The graduate is ready to systematically update his/her natural knowledge and to apply it in practice	The student updates his knowledge of molecular taxonomy and knows its practical applications.	[SK4] test/exam - oral or written
[OZPL3_W05] The graduate understands the principles and mechanisms of life at the population, biocenosis, and ecosystem levels, as well as the temporal and spatial factors that influence biodiversity.	The student applies basic statistical methods and computer algorithms and techniques used to identify species.	[SW4] test/exam - oral or written
[OZPL3_W09] The graduate possesses an advanced comprehension of the current state of knowledge and the latest trends in protection of natural resources, as well as their relationship to other natural disciplines	The student explains the principles of using molecular methods in species identification and understands the advantages, disadvantages and limitations of their application.	[SW4] test/exam - oral or written
[OZPL3_W02] The graduate possesses advanced knowledge and understanding of the mechanisms governing the flow of genetic information, its regulation, the principles of inheritance, and the origins of variation in organisms	The student explains the rules of inheritance and sources of variation in organisms in the problem of species identification.	[SW4] test/exam - oral or written

Subject contents

- Molecular markers used in taxonomic studies.

- Molecular techniques used in taxonomy.

- Statistical methods in the analysis of molecular data. Phylogenetic inference.

- Current methods for delineating taxonomic units based on molecular data.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written pass (test and open questions)	51.0%	100.0%

Recommended reading	Basic literature	1. Avise J.C. 2008. Markery molekularne, historia naturalna i ewolucja. Wyd. Uniwersytetu Warszawskiego, Warszawa. 2. Baxevanis A.D., Quellette B.F.F. (red.). 2005. Bioinformatyka. Wydawnictwo Naukowe PWN, Warszawa. 3. Brown T.A. 2001. Genomy. Wydawnictwo Naukowe PWN, Warszawa. 4. Futuyma E.J. 2008. Ewolucja. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa. 5. Hall B.G. 2008. Łatwe drzewa filogenetyczne. Poradnik użytkownika. Wyd. Uniwersytetu Warszawskiego. 6. Krzanowska H. i in. 2002. Zarys mechanizmów ewolucji. Wydawnictwo Naukowe PWN, Warszawa.
	Supplementary literature	1. Cichocka JM, Bielecki A, Kur J, Pikuła D, Kilikowska A, Biernacka B. A new leech species (Hirudinida: Erpobdellidae: Erpobdella) from a cave in the West Azerbaijan province of Iran. Zootaxa. 2015 Sep 9;4013(3):413-27. doi: 10.11646/zootaxa.4013.3.5. PMID: 26623905 2. Falniowski A. 2003. Metody numeryczne w taksonomii. Wydawnictwo UJ, Kraków. 3. Graur D., Wen-Hsiung L. 2000. Fundamentals of Molecular Evolution. Second Edition. Sinauer Associates, Sunder-land, MA. 4. Hall B.G. 2004. Phylogenetic trees made easy: A how to manual. Sinauer Associates, Sunderland, MA. 5. Hennig W. 1966. Phylogenetic Systematics. University of Illinois Press, Urbana IL. 6. Hills D.M. i in. (red.). 1996. Molecular systematic. Sinauer Associates, Sunderland, MA. 7. Salemi M. Vandamme A.M. 2003. The Phylogenetic Handbook: A Practical Approach to DNA and Protein Phylogeny. Cambridge University Press.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Using molecular biology techniques in taxonomy and phylogenetic studies; DNA barcoding as a new tool in species identification; Molecular markers used in phylogenetics and species identification;	
Work placement	Not applicable	