

Subject card

Subject name and code	Molecular Taxonomy of Marine Organisms - lecture, PG_00204910						
Field of study	Oceanography						
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 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			exam		
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	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	2.0	18.0	50		
Subject objectives	Familiarize students with the basic issues of the origin of marine organisms and the relationship between them at different taxonomic levels.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language)		Knows, understands and correctly uses specialized terminology describing evolutionary processes and taxonomic diversity of living organisms in the marine environment (in Polish and a selected foreign language) (curriculum content: A.1-5)		[SW4] test/exam - oral or written		
Subject contents	<ol style="list-style-type: none"> Species concept. Features (at the morphological, anatomical, biochemical, and genetic levels) important in assessing the relatedness of species. Phenetic and phylogenetic taxonomy. Main assumptions of molecular evolution. Origin of life and the theory of endosymbiosis. Molecular phylogeny: selection of appropriate genetic markers and characterization of the main methods of constructing phylogenetic trees (distance methods, parsimony method and methods associated with the highest reliability). Interpretation of phylogenetic trees, principles of formation of taxonomic units - operational taxonomic units [OTUs], the role of morphological data in justifying taxonomic units formed on the basis of molecular data, phylogenetic trees of genes versus phylogenetic trees of species. Phylogeny of major groups of organisms in the marine environment. Case studies - analysis of the taxonomic position of selected groups of organisms. 						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		written exam (1h)	51.0%
Recommended reading	Basic literature	<p>1. Arnason U., Gullberg A., Janke A., Kullberg M., Lehman N., Petrov E.A., Vainola R. 2006. Pinniped phylogeny and a new hypothesis for their origin and dispersal. <i>Molecular Phylogeny and Evolution</i>. 41: 345-354.</p> <p>2. Bourlat S.J., Nielsen C., Economou A.D., Telford M.J. 2008. Testing the new animal phylogeny: a phylum level molecular analysis of the animal kingdom. <i>Molecular Phylogenetics and Evolution</i>. 49: 23-31.</p> <p>3. Falkowski P.G., Katz M.E., Knoll A.H., Quigg A., Raven J.A., Schofield O., Taylor F.J.R. 2004. The evolution of modern eukaryotic phytoplankton. <i>Science</i>. 305: 354-260.</p> <p>4. Katz L.A., Grant J.R., Wegener Parfrey L., Burleigh J.G. 2010. Turning the crown upside down: gene tree parsimony roots the eukaryotic tree of life. <i>Systematic biology</i>. DOI:10.1093/sysbio/sys026.</p> <p>5. Keeling P.J. 2004. Diversity and evolutionary history of plastids and their hosts. <i>American Journal of Botany</i>. 91(10): 1481-1493.</p> <p>6. Medina M., Collins A.G., Taylor J.W., Valentine J.W., Lipps J.H., Amaral-Zettler L., Sogin M.L. 2003. Phylogeny of Opisthokonta and the evolution of multicellularity and complexity in Fungi and Metazoa. <i>International Journal of Astrobiology</i>. 2(3): 203-211.</p> <p>7. Motani R. 2009. The evolution of marine reptiles. <i>Evo Edu Outreach</i>. 2: 224-235.</p> <p>8. Penny D., Poole A. 1999. The nature of the last universal common ancestor. <i>Current Opinion in Genetics & Development</i>. 9: 672-677.</p> <p>9. Rosslenbroich B. 2005. The evolution of multicellularity in animals as a shift in biological autonomy. <i>Theory in Biosciences</i>. 123: 243-262.</p> <p>10. Russell M.J., Martin W. 2004. The rocky roots of the acetyl-CoA pathway. <i>TRENDS in Biochemical Sciences</i>. doi:10.1016/j.tibs.2004.05.007.</p> <p>11. Uhen M.D. 2007. Evolution of marine mammals: back to the sea after 300 million years. <i>The anatomical record</i>. 290: 514-522.</p> <p>12. Yoon H.Y., Hackett J.D., Ciniglia C., Pinto G., Bhattacharya D. 2004. A molecular timeline for the origin of photosynthetic eukaryotes. <i>Molecular Biology and Evolution</i>. 21(5): 809-818.</p>	
	Supplementary literature	<p>1. Ansorge J.W. 2009. Next-generation DNA sequencing techniques. <i>New Biotechnology</i>. 25(4): 195-203.</p> <p>2. Kircher M., Kelso J. 2010. High-throughput DNA sequencing concepts and limitations. <i>Bioessays</i>. 32: 524-536.</p> <p>3. Spalik K., Piwczyński M. 2009. Rekonstrukcja filogenezy i wnioskowanie filogenetyczne w badaniach ewolucyjnych. <i>Kosmos. Problemy nauk biologicznych</i>. 58(3-4): 485-498.</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.