University of Gdańsk

Subject card

Subject name and code	Palaeoarthropodology, PG_00154179		
Field of study	Paleoartropodologia (Konwersatorium)		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
Education level	Master's studies	Subject group	
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish Polish/English
Semester of study	3	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Laboratory of Evolutionary Entomology and Museum of Amber Inclusions -> Katedra Zoologii Bezkręgowców i Parazytologii -> Faculty of Biology -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Jacek Szwedo	
	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	4.0	16.0	50

Subject objectives

1. Understand the evolutionary processes of arthropods.2. Know and understand the interactions and relationships shaping the evolutionary history of different groups of extinct and modern arthropods.3. Know and understand the evolutionary gains and sources of evolutionary success of different groups of extinct and modern arthropods.4. Know and understand methods of studying the arthropod fossil record and how to interpret it evolutionarily and functionally.5. Learn and understand the evolutionary changes in biodiversity and changes in faunal complexes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMU2_K05] the graduate is prepared to use recognised sources of scientific and popular information in the biological sciences to further his or her knowledge	1. Knows the importance of using reliable sources of scientific and popular science information in the field of biological and earth sciences to improve their knowledge.	[SK1] wypowiedź ustna/rozmowa/ dyskusja [SK2] prezentacja/projekt/referat/ raport [SK3] opracowanie tekstowe/ praca pisemna
[BIOLMU2_U07] the graduate is able to critically confront biological information from a variety of sources and, on this basis, draw valid conclusions	1. Understanding the evolutionary process of arthropods. 2. Knowledge and understanding of interactions and relationships shaping the evolutionary history of different groups of arthropods extinct and contemporaries. 3. Knowledge and understanding of the evolutionary achievements and sources of the evolution of the various groups of arthropods extinct and contemporaries. 4. Knowledge and understand the methods of studying the fossil record of arthropods and the ways of its evolutionary and functional interpretation. 5. Knowledge and understanding of changes in biodiversity and the change of the faunistic complexes in evolutionary aspect	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport [SU3] opracowanie tekstowe/ praca pisemna
[BIOLMU2_W01] the graduate has an in-depth knowledge and understanding of natural phenomena and processes at different levels of complexity	1. Identify and characterise the main evolutionary trends of arthropods. 2. Recognise and relate arthropod evolutionary patterns and scenarios to biotic and environmental changes in Earth's geological history. 3. Correctly identify and interpret observed morphological and adaptation changes to a changing environment. 4. Understand and interpret palaeontological research methods. 5. Understand the evolutionary changes and adaptations of different arthropod groups.	[SW1] wypowiedź ustna/rozmowa/ dyskusja [SW2] prezentacja/projekt/referat/ raport [SW3] opracowanie tekstowe/ praca pisemna
[BIOLMU2_U03] the graduate can critically analyse and select biological information, especially from electronic sources	1. Demonstrates the ability to critically analyse and select biological information, especially from internet and electronic sources. 2. Critically confronts biological information from various sources and draws reasoned conclusions based on this.	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport [SU3] opracowanie tekstowe/ praca pisemna
[BIOLMU2_W04] the graduate has an in-depth knowledge of the chosen speciality of biological sciences	1. understands the importance of evolutionary processes and ecological events in shaping biodiversity 2. understands the principles of morphological comparative analysis 3. understands palaeo-evo-devo relationships in reconstructing affinities, phylogenetic trees and evolutionary scenarios	[SW1] wypowiedź ustna/rozmowa/ dyskusja [SW2] prezentacja/projekt/referat/ raport [SW3] opracowanie tekstowe/ praca pisemna

Subject contents

- The origin of arthropods.
- Arthropodisation, morphological and behavioural changes of primary arthropods.
- Adaptations to new habitats.
- Evolutionary gains of arthropods. - Sources of arthropod evolutionary success
- The arthropod fossil record and its interpretation
- Arthropod palaeodiversity in different habitats as documented in the fossil record
- Changes in arthropod palaeodiversity during Earth's geological history.

Prerequisites and co-requisites	A. Formal requirements biology zoology taxonomy ecology B. Prerequisites Basic knowledge in biology, zoology, ecology, classification of organisms	
Assessment methods and criteria	Subject passing criteria	Passing threshold / Percentage of the final grade
	activity/presentation/report	51.0% / 100.0%
Recommended reading	Basic literature	• Benton M.J., Harper D.A.T. 2009. *Introduction to paleobiology and the fossil record*. Wiley-Blackwell, Oxford. • Beutel R.G., Friedrich F., Yang X.-K., Ge S.-Q. 2013. *Insect morphology and phylogeny. A textbook for students of entomology*. De Gryuter, Berlin. • Błaszak C. (red.) 2011-2012. *Zoologia. Stawonogi. Tom 2, cz. 1 i 2.* PWN, Warszawa • Dzik J. 2011. *Dzieje Życia na Ziemi*. PWN, Warszawa. • Dzik J. 2015. *Zoologia. Różnorodność i pokrewieństwa zwierząt.* Wydawnictwo Uniwersytetu Warszawskiego, Warszawa. • Dunlop J.A., Penney D. 2012. *Fossil spiders.* Siri Scientific Press, Manchester. • Engel M.S., Grimaldi, D. 2005. *Evolution of insects*. Cambridge University Press, Cambridge. • Giribet G., Edgecombe G.D. 2020. *The invertebrate tree of life*. Princeton University Press. • Lawrance P., Stammers S. 2014. *Trilobites of the World: An atlas of 1000 photographs*. Siri Scientific Press, Manchester. • Minelli A., Boxshall G., Fusco G. (eds) 2013. *Arthropod Biology and Evolution*. Springer, Heidelberg, New York, Dordrecht, London. • Penney D., Jepson J.E. 2014. *Fossil insects. An introduction to palaeoentomology*. Siri Scientific Press, Manchester. • Penney D., Selden P.A. 2011. *Fossil spiders: the evolutionary history of a mega-diverse order*. Siri Scientific Press, Manchester. • Platnick N.I. 2020. *Spiders of the World: A natural history.* Princeton University Press, Princeton. • Radwańska U. 2007. *Podstawy paleontologii.* Wydawnictwo Uniwersytetu Warszawskiego, Warszawa. • Schram F.R., Koenemann S. (eds) 2022. *Evolution and phylogeny of Pancrustacea: A story of scientific method.* Oxford Academic, New York. • Szadziewski R., Szwedo J., Sontag E. 2018. Fauna lasu bursztynowego / Fauna of the amber forest. pp. 3875, 216217. In: Szadziewski R., Pytlos R., Szwedo J. (eds.), *Bursztyn bałtycki skarb Zatoki Gdańskiej / Baltic amber treasure of the Bay of Gdańsk.* Związek Miast i Gmin • Szwedo J. 2018. The unity, diversity and conformity of bugs (Hemiptera) through time. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* **107** (2-3), 109-128. doi:10.1017/S175569101700038X • Thiel M., Poore G. (eds) 2020. *The natural history of the Crustacea. Vol. 8. Evolution and biogeography.* Oxford University Press, Oxford, UK. • Thiel M., Watling L. (eds) 2015. *The natural history of the Crustacea. Vol. 2. Lifestyles and feeding biology*. Oxford University Press, Oxford, UK. • Watling L., Thiel M. (eds) 2013. *The natural history of the Crustacea. Vol. 1. Functional morphology and diversity*. Oxford University Press, Oxford, UK. • Zherikhin V.V., Pomomarenko A.G., Rasnitsyn A.P. 2008. *Vvedenie w paleoentomologiyu*. KMK, Moskva.
	Supplementary literature	• Chipman A.D. (2024) *Organismic animal biology: An evolutionary approach*. Oxford Academic, https://doi.org/10.1093/oso/9780192893581.001.0001 • Ostachuk, A. (2024) A network analysis of early arthropod evolution and the potential of the primitive. *Scientific Reports* **14**, 503 https://doi.org/10.1038/s41598-023-51019-x • Shaw R.S. (2014) Planet of the bugs. Evolution and the rise of insects. University of Chicago Press, xiv+240 pp. https://doi.org/10.7208/9780226163758
	eResources addresses	

Example issues/ example questions/ tasks being completed	Comparison of tagmisation The process of cephalization and its causes Evolution and specialisation of mouth appendages
Work placement	Not applicable

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