



Fundusze Europejskie
dla Rozwoju Społecznego



Rzeczpospolita
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COURSE SYLLABUS		
1.	Course title:	
	International spring school in Warsaw Introduction to subfossil invertebrates from lake sediments: a laboratory-based school. 20-24.04.2026, Warsaw	
2.	Lecturers:	
	<i>professor Edyta Zawisza, Institute of Geological Sciences, Polish Academy of Sciences</i> <i>dr Marta Wojewódka-Przybył, Institute of Geological Sciences, Polish Academy of Sciences</i> <i>professor Agnieszka Pociecha, Institute of Nature Conservation, Polish Academy of Sciences</i>	
3.	Field, type and level of studies, year of study:	
	<i>Paleolimnology, paleoecology, limnology, Holocene studies, climate change students (bachelor, master and doctoral), all years students in area of biology, geology, ecology, geography or similar</i>	
4.	Course character:	
	<i>Workshop with lecture and practical laboratory and microscopy sessions</i>	
5.	Teaching method:	
	<i>Presential workshop, lectures and tutorial studies</i>	
6.	Language:	<i>English</i>
7.	Course type and number of hours:	
	Workshop (40h)	
8.	Estimated load of student's independent work:	10 h



PROM – krótkookresowa wymiana akademicka – nabór 2025;

Projekt finansowany przez Narodową Agencję Wymiany Akademickiej ze środków programu Fundusze Europejskie dla Rozwoju Społecznego 2021–2027 (FERS);
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9.	Total workload and number of ECTS points:	2 ECTS
10.	Short description and main focus of the course:	
	<i>The main objective of the Introduction to Subfossil Invertebrates from Lake Sediments: A Laboratory-Based School is to present paleoecological methods used to study various sedimentary environments, such as lakes and peat bogs. Participants will take part in both chemical and microscopy laboratory sessions, where they will explore the significance of invertebrate remains preserved in freshwater sediments.</i> <i>The course will cover the biological composition of subfossil invertebrate communities (Cladocera, Rotifera) and demonstrate how this knowledge can be applied to ecological and paleolimnological reconstructions.</i> <i>The workshop will also address two key topics: distinguishing natural processes (e.g., climatic influences) from human impacts in paleoenvironmental records, and improving the quality and reliability of reconstruction methods. Ultimately, our goal is to enhance the understanding of climatic, environmental, and socio-ecological processes through insights gained from the study of the past.</i>	
11.	References:	
	<i>Frey, DG (1987) The taxonomy and biogeography of the Cladocera. Hydrobiologia 145: 5–17</i> <i>Korosi, J.B., Smol, J.P. (2012) An illustrated guide to the identification of cladoceran subfossils from lake sediments in northeastern North America: part 1—the Daphniidae, Leptodoridae, Bosminidae, Polyphemidae, Holopedidae, Sididae, and Macrothricidae. J Paleolimnol 48: 571–586</i> <i>Korosi, J.B., Smol, J.P. (2012) An illustrated guide to the identification of cladoceran subfossils from lake sediments in northeastern North America: part 2—the Chydoridae. J Paleolimnol 48: 587–622</i> <i>Smirnov, N.N. (1996) Cladocera: the Chydorinae and Sayciinae (Chydoridae) of the world. In: Dumont HJ (ed) Guide to the identification of the microinvertebrates of the continental waters of the world. SPB Academy Publishing, Amsterdam</i> <i>Sweetman, J.N., Smol, J.P. (2006) A guide to the identification of cladoceran remains (Crustacea: Branchiopoda) in Alaskan lake sediments. Arch Hydrobiol (Supplement) 151: 353–394</i> <i>Szeroczyńska, K., Sarmaja-Korjonen, K. (2007) Atlas of subfossil Cladocera from central and northern Europe. Friends of the Lower Vistula Society, Świecie</i> <i>Whiteside, M.C., Swindoll, M.R. (1988) Guidelines and limitations to cladoceran paleoecological interpretations. Palaeogeogr Palaeoclimatol Palaeoecol 62(1–4): 405–412</i> <i>Wojewódka, M., Sinev, A.Y., Zawisza, E. (2020) A guide to the identification of subfossil non-</i>	



	<i>chydorid Cladocera (Crustacea: Branchiopoda) from lake sediments of Central America and the Yucatan Peninsula, Mexico: part I. J Paleolimnol 63: 269–282</i> <i>Wojewódka, M., Sinev, A.Y., Zawisza, E., Stańczak J. (2020) A guide to the identification of subfossil chydorid Cladocera (Crustacea: Branchiopoda) from lake sediments of Central America and the Yucatan Peninsula, Mexico: part II. J Paleolimnol 63: 37–64</i>
12.	Prerequisites:
	<i>Paleoecology, paleolimnology, climatology, Holocene, zooplankton studies, subfossil Cladocera and Rotifera</i>
13.	Educational outcomes:
	Knowledge: Upon successful completion of this course, students will be able to: • explain the theoretical foundations of paleoecological methods and their applications in reconstructing past environments; • describe the composition and formation of lacustrine sediments and their significance for paleoecological research; • discuss the taxonomic principles underlying the identification of invertebrate remains, with particular emphasis on Cladocera and Rotifera, including classification to the species level where possible; • summarize the fundamental approaches and techniques used in the analysis and interpretation of paleolimnological data.
	Practical Skills: This course provides a comprehensive introduction to: • standard laboratory techniques for separating invertebrate remains from lacustrine sediments; • collecting, preparing, and mounting invertebrate remains for microscopic examination; • identifying and classifying invertebrate remains using light microscopy and taxonomic keys; • conducting basic analyses of paleolimnological data and interpreting results within ecological and environmental contexts.
	Social Skills: During the workshop, students will: • collaborate effectively within small research teams during laboratory and fieldwork sessions; • communicate scientific findings clearly and constructively in group discussions and presentations; • develop critical thinking and problem-solving skills through peer interaction and collaborative data interpretation; • demonstrate awareness of research ethics and open science principles in team-



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	<i>based activities.</i>
14.	Evaluation of the educational outcomes:
	<i>Student's commitment during the workshop, discussions during workshop time and external examination</i>
15.	Criteria to complete the course:
	<i>To successfully complete the course, students must attend at least 80% of all scheduled classes and activities, and obtain a positive evaluation in the final practical examination, which assesses their ability to identify the principal Cladocera and Rotifera remains using a light microscope. Active participation throughout the workshop is also expected.</i>
16.	Contact with the course leader/lecturer:
	<i>ezawisza@twarda.pan.pl (Edyta Zawisza) and m.wojed@twarda.pan.pl (Marta Wojewódka-Przybył)</i>



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