University of Gdańsk

Subject card

Subject name and code	Pollution of lakes – Paleoenvironmental Perspective (Lecture), PG_00201563		
Field of study	Physical geography and geoinformation		
Date of commencement of studies	October 2026	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	2	Language of instruction	English
Semester of study	3	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Laboratory of Palaeoenvironmental Research -> Department of Geomorphology and Quaternary Geology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Wojciech Tylmann	
	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	1.0	34.0	50

Subject objectives

The overall goals of this course are to:
1. provide students with an introduction to the concepts and techniques useful for studying the nature of past environmental change,
2. present the possibilities of using lake sediments to reconstruct pollution changes at different time scales,
3. highlight the role of interdisciplinary research in understanding environmental change in the past.
The course has been designed to give opportunity for discussion on particular case studies.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GFGMU2_U06] is able to characterize comprehensively the selected area, explaining the causes of physical and geographical diversity and assessing contemporary changes in the landscape, along with an attempt to present a forecast of the further directions of development	Student is able to provide a comprehensive description of a selected study site, such as a lake, explaining the causes of its physical-geographical diversity and assessing current changes taking place within the site and its surroundings, whilst attempting to forecast the future direction of development.	[SU1] oral statement/conversation/ discussion
[GFGMU2_W02] knows and understands issues in the field of exact sciences enabling the understanding of complex processes and phenomena occurring in the Earth's natural environment, and in their interpretations consistently relay on empirical foundations, using qualitative and quantitative methods	Student understands the complex processes and phenomena occurring in the Earth's natural environment, drawing on a solid empirical foundation and applying both qualitative and quantitative methods	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>Module 1: Sediments a memory of lake ecosystems
1. Introduction to the course (1 hour).
2. Lake sediments as environmental archives (2 hours).
3. Geochronological clock in lake sediments (2 hours).

Module 2: Methods of reconstructions a paleolimnological toolkit
4. Environmental proxy data in sediments and their interpretation (2 hours).
5. Calibration of proxy data toward quantitative reconstructions (2 hours).

Module 3: Case studies pollution-related problems investigated using paleolimnological approach
6. Eutrophication tracking the causes and symptoms of land-use change and over-fertilization (2 hours).
7. Acidification inferring the consequences of industrial pollution and acidic precipitation (2 hours).
8. Heavy metals and persistent organic pollutants history of environmental pollution (2 hours).</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>A level of English sufficient to read, write and understand the course content.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>written test</td><td>51.0%</td><td>20.0%</td></tr>
<tr><td>written test</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>written test</td><td>51.0%</td><td>30.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Textbooks:
Birks H.J.B., Lotter A.F., Juggins S., Smol J.P. (eds.), 2012. Tracking Environmental Change Using Lake Sediments. Volume 5: Data Handling and Numerical Techniques. Kluwer, Dordrecht, The Netherlands.
Last W.M., Smol J.P. (eds.), 2001. Tracking Environmental Change Using Lake Sediments. Volume 1: Basin Analysis, Coring, and Chronological Techniques. Kluwer, Dordrecht, The Netherlands.
Last W.M., Smol J.P. (eds.), 2001. Tracking Environmental Change Using Lake Sediments. Volume 2: Physical and Geochemical Methods. Kluwer, Dordrecht, The Netherlands.
Smol J.P., Birks H.J.B., Last W.M. (eds.), 2002. Tracking Environmental Change Using Lake Sediments. Volume 3: Terrestrial, Algal, and Siliceous Indicators. Kluwer, Dordrecht, The Netherlands.
Smol J.P., Birks H.J.B., Last W.M. (eds.), 2002. Tracking Environmental Change Using Lake Sediments. Volume 4: Zoological Indicators. Kluwer, Dordrecht, The Netherlands.
Smol J., 2008. Pollution of Lakes and Rivers. A Paleoenvironmental Perspective, Kluwer.

Journals:
Journal of Paleolimnology as the primary source for paleolimnological articles,</td></tr>
<tr><td>Supplementary literature</td><td>Dissemination of papers in the field of paleolimnology can be found in several other journals including The Holocene, Palaeogeography, Palaeoclimatology, Palaeoecology, Quaternary Research, Quaternary Science Reviews, Limnology and Oceanography, etc.

Internet:
PAGES Past Global Changes http://www.pages.unibe.ch</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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