

**Subject card**

|  |  |  |                      |                                     |  |            |     |
|--|--|--|----------------------|-------------------------------------|--|------------|-----|
| <b>Subject name and code</b>                       | Long-term changes in the natural environment, PG_00198109  |  |                      |                                     |  |            |     |
| <b>Field of study</b>                              | Natural Resources Conservation   |  |                      |                                     |  |            |     |
| <b>Date of commencement of studies</b>             | October 2026   | <b>Academic year of realisation of subject</b>           |                      |                                     | 2027/2028  |            |     |
| <b>Education level</b>                             | Bachelor's studies   | <b>Subject group</b>                                     |                      |                                     | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |            |     |
| <b>Mode of study</b>                               | full-time studies  | <b>Mode of delivery</b>                                  |                      |                                     | at the university  |            |     |
| <b>Year of study</b>                               | 2  | <b>Language of instruction</b>                           |                      |                                     | Polish   |            |     |
| <b>Semester of study</b>                           | 4  | <b>ECTS credits</b>                                      |                      |                                     | 1.0  |            |     |
| <b>Learning profile</b>                            | academic   | <b>Assessment form</b>                                   |                      |                                     | credit   |            |     |
| <b>Conducting unit</b>                             |  |  |                      |                                     |  |            |     |
| <b>Name and surname of lecturer (lecturers)</b>    | <b>Subject supervisor</b>  |  | dr Anna Pędziszewska |                                     |  |            |     |
|  | <b>Teachers</b>  |  |                      |                                     |  |            |     |
| <b>Lesson types</b>                                | <b>Lesson type</b>   | Lecture  | Tutorial             | Laboratory                          | Project  | Seminar    | SUM |
|  | <b>Number of study hours</b>   | 0.0  | 0.0                  | 15.0                                | 0.0  | 0.0        | 15  |
|  | E-learning hours included: 0.0   |  |                      |                                     |  |            |     |
| <b>Learning activity and number of study hours</b> | <b>Learning activity</b>   | Participation in didactic classes included in study plan |                      | Participation in consultation hours |  | Self-study | SUM |
|  | <b>Number of study hours</b>   | 15   |                      | 3.0                                 |  | 7.0        | 25  |
| <b>Subject objectives</b>                          | To provide a basic knowledge of long-term environmental change as a basis for assessing contemporary natural processes and possible future environmental change. To demonstrate the necessity of interdisciplinary research, taking into account the geological time scale, for understanding mechanisms of environmental change. To be introduced to the possibilities of using bioindicative properties of different groups of organisms for palaeoenvironmental reconstructions. To acquire the theoretical knowledge and practical skills needed to select palaeoecological methods and sites. |  |                      |                                     |  |            |     |

| Learning outcomes   | Course outcome  | Subject outcome  | Method of verification  |
|---|---|--|---|
|   | [OZPL3_U04] The graduate is able to plan and carry out simple research tasks in the biological sciences under the guidance of a supervisor  | performs simple research tasks under the guidance of a mentor in the area of palaeoecology   | [SU5] implementation of a problem task  |
|   | [OZPL3_U01] The graduate is able to use basic apparatus and research tools, maintains the correct sequence of operations in laboratory and field work and apply the principles of savoir-vivre in practice  | uses basic research apparatus and tools and maintains the correct sequence of operations in laboratory and field work  | [SU8] observation of student's independent or team work   |
|   | [OZPL3_W11] The graduate have an advanced knowledge and understanding of the concepts and terminology of natural science, as well as knowledge of the evolution of natural sciences and the research methods employed in them. They are also cognizant of the potential for practical application | is familiar with basic palaeoecological concepts and terminology and is aware of their of their potential use in predicting future environmental change  | [SW1] oral statement/<br>conversation/discussion<br>[SW3] text preparation/written work<br>[SW5] implementation of a problem task |
|   | [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.  | explain the basic principles and describe the mechanisms of ecosystem functioning and the temporal and spatial determinants of changes in the natural environment                                  | [SW3] text preparation/written work   |
|   | [OZPL3_K06] The graduate is prepared to demonstrate responsibility for their own and others' safe working conditions in the laboratory and in the field, and is able to recognise hazardous situations and take appropriate action  | demonstrates responsibility for his/her own and others' safe working conditions in the laboratory and in the field, and is able to recognise hazardous situations and take take appropriate action | [SK8] observation of student's independent or team work   |
|   | [OZPL3_K08] The graduate is ready to systematically update his/her natural knowledge and to apply it in practice  | systematically updates his/her knowledge of nature and knows its practical applications  | [SK1] oral statement/conversation/discussion  |
|   | [OZPL3_W06] The graduate has an advanced understanding of the names and types of natural environments, including their structural and functional characteristics  | names the types of palaeoecological sites and characterises the degree of of transformation of the natural environment   | [SW3] text preparation/written work   |
|   | [OZPL3_K01] The graduate is ready to recognise the limitations in his/her own knowledge and understands the need for continuous learning and development  | knows the limitations of his/her own knowledge and understands the need for continuous learning and development  | [SK1] oral statement/conversation/discussion  |
| [OZPL3_U06] The graduate is able to make observations and perform basic physical, biological and chemical measurements in the field or laboratory | makes observations of palaeoecological material and performs in the field and laboratory basic descriptions and analyses of the material  | [SU3] text preparation/written work<br>[SU6] demonstration of practical skills   |   |
| Subject contents  | basics of description and determination of palaeoecological sediments (lithological description by Troels-Smith method). Familiarisation with types of Fossil remains and proper methods of preservation. Basics of pollen and macroscopic plant remains analysis methodology.                    |  |   |
| Prerequisites and co-requisites   |   |  |   |
| Assessment methods and criteria   | Subject passing criteria  | Passing threshold  | Percentage of the final grade   |
|   | report II   | 51.0%  | 50.0%   |
|   | report I  | 51.0%  | 50.0%   |

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|--|--|---|
| Recommended reading  | Basic literature   | <p>Przewodnik do oznaczania torfów i osadów jeziornych. PWN, Warszawa.</p> <p>Berglund B.E. 1986. Handbook of Holocene Palaeoecology and Palaeohydrology. Wiley &amp; Sons, Chichester-New York</p> <p>Moore, P.D., Webb, J.A. and Collinson, M.E. (1991) Pollen Analysis. 2nd Edition, Blackwell, Oxford, 1-216.</p> |
|  | Supplementary literature   | <p>Dybova-Jachowicz S., Sadowska A. (red.). 2003. Palinologia. Wyd. IB PAN, Kraków.</p> <p>Lityńska-Zajac M., Wasylkowa K. 2005. Przewodnik do badań archeobotanicznych. Sorus, Poznań. Tobolski K. 2000.</p>   |
|  | eResources addresses   |   |
| Example issues/<br>example questions/<br>tasks being completed | <p>learning to determine pollen grains of basic tree species<br/>preparation of palynological samples for acetolysis.<br/>pollen analysis of palynological samples (basics)<br/>analysis of chironomideae (basics)</p> |   |
| Work placement   | Not applicable   |   |

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