



JAGIELLONIAN
UNIVERSITY
IN KRAKÓW

Aquatic ecosystems – structure and function

Educational subject description sheet

Basic information

Field of study Environmental Protection and Management		Education cycle 2021/22
Speciality -		Subject code UJ.WBIEPMS.220.00804.21
Organizational unit Faculty of Biology		Lecture languages english
Study level second cycle		Disciplines Biological sciences
Study form full-time degree programme		ISCED classification 0511 Biology
Education profile General academic		USOS code
Mandatory obligatory		
Subject coordinator	Wojciech Fiałkowski	
Lecturer	Janusz Fyda, Krzysztof Wiackowski, Wojciech Fiałkowski	
Period Semester 2	Examination assessment Activities and hours Lecture: 13 Classes: 6 Discussion class: 5 Fieldwork classes: 6	Number of ECTS points 2.0

Goals

C1	Elucidating feedbacks between physical, chemical, and biological processes shaping aquatic ecosystems
C2	Identification of threats to proper functioning of aquatic biota.
C3	Acquisition of basic skills in the assessment of ecological status of water bodies.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	Student describes structure and function of main types of aquatic ecosystems as an effect of complex interplay of physical, chemical, and biological processes	EPM_K2_W01, EPM_K2_W02	written credit
W2	Student is aware of the main developments in aquatic ecology, and understands the value of interdisciplinary research.	EPM_K2_W02, EPM_K2_W04, EPM_K2_W06	written credit
W3	Student recognises global threats to aquatic biota	EPM_K2_W04, EPM_K2_W05	written credit
W4	Student knows biology of main groups of aquatic organisms, and the roles they play in the ecosystem	EPM_K2_W01, EPM_K2_W04	written credit
Skills - Student can:			
U1	Student is capable of locating reliable sources of information, and appropriately employing obtained knowledge.	EPM_K2_U06, EPM_K2_U08	oral credit, report
U2	Student knows appropriate methods of sampling aquatic organisms, and can employ them.	EPM_K2_U01, EPM_K2_U07	oral credit, report
U3	Student recognises common taxa of aquatic macroinvertebrates. Using relevant literature can precisely identify them.	EPM_K2_U01, EPM_K2_U03, EPM_K2_U06	oral credit
U4	Student possesses necessary skills to prepare and deliver presentation on any important subject in aquatic ecology.	EPM_K2_U03, EPM_K2_U04, EPM_K2_U06	oral credit, report
Social competences - Student is ready for:			
K1	Student is aware of complexity of phenomena and processes controlling the functioning of aquatic ecosystems.	EPM_K2_K04, EPM_K2_K07	oral credit
K2	Student understands the necessity of permanent learning.	EPM_K2_K01, EPM_K2_K04	oral credit, report
K3	Student skilfully organises teamwork, complying with health and safety regulations.	EPM_K2_K05, EPM_K2_K06, EPM_K2_K07	report

Calculation of ECTS points

Activity form	Activity hours*
Lecture	13
Classes	6
Discussion class	5
Fieldwork classes	6

preparation for exercises	5	
report preparation	10	
preparation for a test	10	
conducting literature studies	5	
Student workload	Hours 60	ECTS 2.0

* hour means 45 minutes

Study content

No.	Course content	Subject's learning outcomes
1.	Lectures: <ul style="list-style-type: none"> • Characteristics of water important for aquatic organisms. • Different types of freshwater biota and abiotic conditions shaping them. • River continuum concept. • Assemblages of aquatic organisms and abiotic factors controlling them. • Carbon cycling and forms of organic matter. • Differences in carbon cycle in rivers and lakes. • Trophic state of lakes and eutrophication. • Pollution of surface waters. 	W1, W2, W3, W4, K1, K2
2.	Seminars: <ul style="list-style-type: none"> • Basics of biomanipulation in aquatic ecosystems. • Macroinvertebrates as biomonitors in aquatic systems. • Methods of bioassessment. 	W2, W3, U1, U4, K1, K2
3.	Laboratory and field classes: <ul style="list-style-type: none"> • Main groups of aquatic organisms: biology and ecology. • Main groups of aquatic organisms: identification. • Setting up a sampling programme. • Sampling equipment and techniques. • Safety during field work. • Processing of samples collected in the field. 	W2, W4, U2, U3, K1, K3

Course advanced

Teaching methods :

seminar, conversation lecture, lecture with multimedia presentation, discussion, laboratories, practicals

Activities	Examination methods	Credit conditions
Lecture	written credit	Writing assignment consisting of both closed and open questions. Required knowledge of basic characteristics of main types of aquatic ecosystems, as well as of main groups of macrobenthic invertebrates
Classes	report	During practicals, students' involvement in the identification of aquatic macroinvertebrates will be assessed.
Discussion class	oral credit	Active involvement in discussion will be assessed.

Activities	Examination methods	Credit conditions
Fieldwork classes	report	During field trips, students should demonstrate skill in safe and efficient sampling, and knowledge of macroinvertebrates allowing recognising and identifying common taxa to family level.

Entry requirements

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Literature

Obligatory

1. Lampert, W, Sommer, U., Limnoecology: The Ecology of Lakes and Streams. Oxford University Press, Oxford, 2007.
2. Allan, J. David, Castillo, María M., Stream Ecology: Structure and function of running waters. Springer Science & Business Media, 2007.

Optional

1. pełnotekstowe bazy danych dostępne za pośrednictwem Biblioteki Jagiellońskiej / Web-based repositories available through the Jagiellonian Library.

Effects

Code	Content
EPM_K2_K01	The graduate is able to critically appraise acquired information, use reliable and well-established sources of scientific information and draw appropriate conclusions when settling practical problems
EPM_K2_K04	The graduate is able to think and act independently to protect natural environment and to manage common resources in a sustainable way
EPM_K2_K05	The graduate is able to plan his/her further career, shape the course of activities pursued by others and use entrepreneurial skills while achieving set goals
EPM_K2_K06	The graduate is able to pursue team work while assuming different roles and also is able to plan the work in terms of sharing responsibilities and managing time
EPM_K2_K07	The graduate is able to identify and settle dilemmas related to his work following the rules of ethics and legal requirements
EPM_K2_U01	The graduate is able to use research procedures and tools appropriate for measures of environment protection and managing natural resources
EPM_K2_U03	The graduate is able to use specialist knowledge necessary to interpret collected empirical data and to draw appropriate conclusions
EPM_K2_U04	The graduate is able to prepare public presentations related to environment and nature protection using various techniques of verbal and multimedia communication
EPM_K2_U06	The graduate is able to search for, select and use necessary information found in various English language sources
EPM_K2_U07	The graduate is able to plan and evaluate the condition of the environment and natural resources under the guidance of the academic supervisor and to evaluate the risks of planned actions and investments for the environment.
EPM_K2_U08	The graduate is able to use specialist terminology related to environment protection and natural resources management
EPM_K2_W01	The graduate knows and understands complexity of natural phenomena and processes and their impact on nature and environment
EPM_K2_W02	The graduate knows and understands methodology of environmental sciences, especially including valorization and evaluation of environmental risks
EPM_K2_W04	The graduate knows and understands contemporary problems of natural environment and is able to point out new threats
EPM_K2_W05	The graduate knows and understands legal changes in environment protection and natural resources management
EPM_K2_W06	The graduate knows and understands the rules of planning research and verifying research hypotheses, as well as research techniques and tools used in the analysis and evaluation of the quality of natural environment