

## Practice in Environmental Sciences Educational subject description sheet

### **Basic information**

Field of study Ecology and Evolution		Education cycle 2020/21	
Speciality -		Subject code UJ.WBIEEVS.250.09561.20	
<b>Organizational unit</b> Faculty of Biology		Lecture languages english	
Study level second cycle		Disciplines Biological sciences	
<b>Study form</b> full-time degree programme		ISCED classification 0511 Biology	
Education profile General academic		USOS code WB.INS.P-48	
Mandatory elective			
Subject coordinator	Maria Niklińska	Ι	
Lecturer	Maria Niklińska, Beata Klime	k	
<b>Periods</b> Semester 1, Semester 3	Examination assessment Activities and hours		Number of ECTS points 2.0
	Lecture: 8		
	Discussion class: 2		
	Fieldwork classes: 2		

### Goals

C1	Presentation of analytical methods and techniques used in environmental science and practical aspects of research
C2	Planning, preparation and conducting the experiment in a small team (3-4 people), created in the course.

# Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	Student recognizes natural processes and phenomena using knowledge of biology, chemistry, statistics and mathematics. Understands the need for interdisciplinarity in scientific research	EEV_K2_W01, EEV_K2_W02, EEV_K2_W06	written credit, credit with grade, project, report, findings, presentation
W2	Knows the principles of observation and measurements as well as the use of research apparatus, knows the basic research tools and techniques used in the study of organisms and the environment.	EEV_K2_W01, EEV_K2_W02	written credit, credit with grade, project, report, findings, presentation
W3	Knows the principles of good laboratory practice and good scientific practice	EEV_K2_W02, EEV_K2_W08	written credit, credit with grade, project, report, findings, presentation
W4	Knows the rules of intellectual property and copyright protection.	EEV_K2_W08	written credit, credit with grade, project, report, findings, presentation
Skills - Stu	ident can:		
U1	Is able to plan and perform a simple laboratory and field experiment in a team, is able to perform analyzes and research tasks under the guidance of a scientific supervisor.	EEV_K2_U01, EEV_K2_U03	written credit, credit with grade, project, report, findings, presentation
U2	Is able to present the results of the experiment in the form of appropriate charts and tables, based on the results obtained is able to develop and write a detailed report containing conclusions and discussion of the results with literature cited and found in scientific databases	EEV_K2_U02, EEV_K2_U03, EEV_K2_U05, EEV_K2_U06, EEV_K2_U08	written credit, credit with grade, project, report, findings, presentation
Social competences - Student is ready for:			
К1	Is able to responsibly plan group work by doing laboratory experiments, knows how to work in a team while preparing a joint report	EEV_K2_K04, EEV_K2_K07	written credit, credit with grade, project, report, findings, presentation
K2	Cares about the reliability and credibility of the results obtained, and about the equipment and apparatus used in the tests, applies health and safety rules in the laboratory	EEV_K2_K01, EEV_K2_K02, EEV_K2_K03, EEV_K2_K08, EEV_K2_K09	written credit, credit with grade, project, report, findings, presentation

## **Calculation of ECTS points**

Activity form	Activity hours*
Lecture	8
Classes	18
Discussion class	2
Fieldwork classes	2

Student workload	Hours 60	<b>ECTS</b> 2.0
preparation of a multimedia presentation	7	
preparation for final test	8	
report preparation	5	
collecting information for a given project	10	

\* hour means 45 minutes

## Study content

No.	Course content	Subject's learning outcomes
1.	Principles and methods of research work in the laboratory and in the field (sampling and storage procedures, selection of the analytical method, reference materials, calibration solutions, dilution series, purity standards, standards in force in laboratories). Principles of analytical equipment operation (AAS, elemental analysis, microplate spectrometry, respirometry, gas chromatography, flow injection analysis, pH determination).	W1, W2, W3, W4, U1, U2, K1, K2
2.	Metody gromadzenia, zapisywania i przedstawiania danych doświadczalnych z wykorzystaniem programów komputerowych. Prawidłowe formy pracy naukowej (tabele, wzory matematyczne, typy wykresów)	W1, W2, W3, W4, U1, U2, K1, K2
3.	Methods for collecting, saving and presenting experimental data using computer programs. Correct form of scientific work (tables, mathematical formulas, chart types)	W1, W2, W3, W4, U1, U2, K1, K2

### **Course advanced**

### Teaching methods :

lecture, conversation lecture, discussion, laboratories, consultation

Activities	Examination methods	Credit conditions
Lecture	written credit, credit with grade	written course assesment in the form of a multiple-choice test and short open questions
Classes	project, report, findings	obligatory attendance at laboratory and field classes and presentation of obtained results in the form of a report
Discussion class	presentation	obligatory presence and presentation plan of the team experiment and results obtained
Fieldwork classes	findings	obligatory presence

## **Entry requirements**

no

### Literature

#### Obligatory

- 1. Jones, A., Duck, R., Reed, R., & Weyers, J. (2000). Practical skills in environmental science. Prentice Hall.
- 2. G.D. Ruxton, N. Colegrave 2003. Environmental design for the life sciences. Oxford University Press
- 3. Ch. Barnard, F. Gilbert, P.McGregor 2007. Asking questions in biology. Pearson Education Ltd

#### Optional

1. C.Ph. Wheater, J. Bell, P.Cook 2011. Practical Field Ecology, Wiley -Blackwell

# Effects

Code	Content
EEV_K2_K01	The graduate is ready to work in a team, assuming different roles, planning their tasks especially in terms of taking up different responsibilities and managing time
EEV_K2_K02	The graduate is ready to listen to, accept or reject proposals offered by other team members
EEV_K2_K03	The graduate is ready to appropriately define priorities related to the tasks assumed by themselves or by others
EEV_K2_K04	The graduate is ready to identify and solve dilemmas related to their job following ethical principles
EEV_K2_K07	The graduate is ready to take advantage of lifelong learning, inspire and organize the process of learning of others
EEV_K2_K08	The graduate is ready to apply self-criticism and draw conclusions on the basis of self-analysis
EEV_K2_K09	The graduate is ready to consistently apply and popularize the rules of a strictly empirical interpretation of biological phenomena and processes in research and practice
EEV_K2_U01	The graduate is able to use advanced research techniques and tools specific for various fields of ecology
EEV_K2_U02	The graduate is able to search for and use scientific data in English obtained from various sources
EEV_K2_U03	The graduate is able to use specialist English terminology in ecology and biology
EEV_K2_U05	The graduate is able to plan and carry out research tasks or expertise work under the guidance of an academic supervisor
EEV_K2_U06	The graduate is able to use advanced statistical tools and numerical techniques relevant for solving problems in ecology and related sciences
EEV_K2_U08	The graduate is able to correctly formulate conclusions and judgements on the basis of collected empirical data
EEV_K2_W01	The graduate knows and understands the complexity of ecological processes and phenomena on the basis of empirical evidence found in various disciplines
EEV_K2_W02	The graduate knows and understands methodology of biological sciences with a special focus on ecology and evolutionism; they can critically analyze data using relevant mathematical and statistical methods
EEV_K2_W06	The graduate knows and understands the complexity of dependencies and mechanisms of evolution
EEV_K2_W08	The graduate knows and understands basic and advanced methods of modeling the occurrence of phenomena and biological processes using mathematic, statistical and computational methods