SYLLABUS – A COURSE DESCRIPTION

I. General informaion

1. Course name: **Applied Aquatic Ecology_2020en**
2. Course code:
3. Course type (compulsory or optional): **optional**
4. Study programme name: **Environmental protection**
5. Cycle of studies (1st or 2nd cycle of studies or full master's programme): **2nd cycle of studies**
6. Educational profile (general academic profile or practical profile): **general academic profile**
7. Year of studies (if relevant): **I and II 2nd cycle of studies**
8. Type of classes and number of contact hours (e.g. lectures: 15 hours; practical classes: 30 hours):
   lectures: 10 hours
   laboratory classes: 20 hours
9. Number of ECTS credits: **3**
10. Name, surname, academic degree/title of the course lecturer/other teaching staff:
    dr hab. Sławomir Cerbin, cerbins@amu.edu.pl
    mgr Łukasz Wejnerowski, lukaweju@gmail.com
11. Language of classes: **english**
12. Online learning – yes (partly – online / fully – online) / no: **The course will be taught in bi-learning mode. The students will be provided with additional materials, exercises, quizzes and homework submission system on e-learning platforms (Moodle and/or Teams).**

II. Detailed information

1. Course aim (aims)
   During the course, students will acquire knowledge in ecology and practical skills in various approaches to aquatic ecosystems protection using standardized as well as innovative methods. Students during the class will use molecular techniques, toxicological tests, and various indicators to assess the ecosystem condition. Moreover, students will conduct experiments (learning by doing) exemplifying the ecological processes regulating ecosystems functioning, mechanisms behind successful biomanipulation, and usage of excess biomass of aquatic microorganisms as natural fertilizers. Students will acquire knowledge about 1) the influence of biotic and abiotic factors on the physiology of keystone organisms, 2) mechanisms influencing the structure and dynamics of aquatic communities, 3) the problem of aquatic invasions in the light of global climate change, and 4) the role of indirect effects in restoration of aquatic ecosystems. The course will also provide knowledge in designing, conducting and analyzing scientific experiments.
2. Pre-requisites in terms of knowledge, skills and social competences (if relevant)
   Basic knowledge in ecology and statistics. Some experience in laboratory work and work with R software is welcomed but not necessary.
3. Course learning outcomes (EU) in terms of knowledge, skills and social competences and their reference to study programme learning outcomes (EK)

Course learning	On successful completion of this course, a student will be able to:	Reference to study programme

outcome symbol (EU)		learning outcomes (EK)
EU_01	Will be equipped with knowledge in ecology and of various approaches to protection of aquatic ecosystems	K_W01, K_W03, K_U01, K_U07, K_K03
EU_02	Students will be familiar with molecular techniques, ecotoxicological tests, and various indicators to assess the ecosystem condition.	K_W03, K_W06, K_U03, K_U08
EU_03	Students will know the influence of biotic and abiotic factors on the physiology of keystone aquatic organisms	K_W01, K_W03, K_W06
EU_04	Students will know mechanisms influencing the structure and dynamics of aquatic communities and apply this knowledge in restoration of aquatic ecosystem	K_W01, K_W03, K_U01, K_U03, K_U04, K_K05
EU_05	Students will recognize the problem of aquatic invasions in the light of global climate change	K_W01, K_W05, K_W06, K_U03, K_U05, K_U04, K_K02, K_K05
EU_06	Students will be able to design, conduct and analyze simple experiments regarding ecological mechanisms applied in restoration	K_W06, K_U01, K_U02, K_U03, K_U07, K_K02, K_U08
EU_07	Students will recognize possibilities for sustainable development in linking environmental protection and industry	K_W05, K_W07, K_W09, K_U10, K_K03, K_K05

4. Learning content with reference to course learning outcomes (EU)

Course learning content	Course learning outcome symbol (EU)
Overview of Methods used in Protection and Restoration of Aquatic Ecosystems	EU_01
Ecology of Keystone Organisms in Aquatic Ecosystems - Influence of Environmental Factors	EU_03, EU_04, EU_01
Indirect Effects in Restoration of Aquatic Ecosystems	EU_01, EU_04
Aquatic Invasions in the Light of Global Climate Change	EU_05
Indicators and Biotests Assessing the Ecosystem Condition	EU_02, EU_06
Using Molecular Tools to Assess Ecosystem Biodiversity	EU_02, EU_01

Ecology of Harmful Algal Blooms	EU_03, EU_04, EU_05, EU_06, EU_01
The Influence of Environmental Factors on Plankton	EU_03, EU_04, EU_06, EU_01
Interspecific Interactions	EU_04, EU_05, EU_06, EU_01
Thermal Tolerance of Autotrophs and Poikilothermic Animals	EU_03, EU_06, EU_01
Effectiveness of Biomanipulation	EU_01, EU_04, EU_06
Aquatic Organisms As Alternative Fertilizers	EU_01, EU_06, EU_07

5. Reading list

Wydawnictwa książkowe

1. Wheater CP, Bell JR, Cook PA: Practical Field Ecology: A Project Guide., Wiley-Blackwell, , 2011

2. Lampert W, Sommer U: Limnoecology: The Ecology of Lakes and Streams., Oxford University Press, , 2007

3. Krebs C: Ecology: The Experimental Analysis of Distribution and Abundance, Benjamin Cummings, , 2009

4. Ruxton G, Colegrave N: Experimental Design for the Life Sciences, Oxford University Press, , 2010

5. Morin PJ: Community Ecology, Wiley-Blackwell, , 2011

III. Additional information

1. Teaching and learning methods and activities to enable students to achieve the intended course learning outcomes (please indicate the appropriate methods and activities with a tick or/and suggest different methods)

Teaching and learning methods and activities	
Lecture with a multimedia presentation	X
Interactive lecture	
Problem – based lecture	X
Discussions	X
Text-based work	
Case study work	X
Problem-based learning	
Educational simulation/game	
Task – solving learning (eg. calculation, artistic, practical tasks)	X
Experiential work	X
Laboratory work	X
Scientific inquiry method	X
Workshop method	X
Project work	
Demonstration and observation	X
Sound and/or video demonstration	X

Creative methods (eg. brainstorming, SWOT analysis, decision tree method, snowball technique, concept maps)	
Group work	X

2. Assessment methods to test if learning outcomes have been achieved (please indicate with a tick the appropriate methods for each LO or/and suggest different methods)

Assessment methods	Course learning outcome symbol						
	EU_1	EU_2	EU_3	EU_4	EU_5	EU_6	EU_7
Written exam							
Oral exam							
Open book exam							
Written test	X	X	X	X	X	X	X
Oral test							
Multiple choice test	X	X	X	X	X	X	X
Project		X	X	X	X	X	X
Essay							
Report		X	X	X	X	X	X
Individual presentation							
Practical exam (performance observation)		X					X
Portfolio							

3. Student workload and ECTS credits

Activity types	Mean number of hours spent on each activity type
Contact hours with the teacher as specified in the study programme	30
Preparation for classes	10
Reading for classes	5
Essay / report / presentation / demonstration preparation, etc.	15
Project preparation	10
Term paper preparation	
Exam preparation	10
Total hours	80
Total ECTS credits for the course	3

4. Assessment criteria according to AMU in Poznan grade system

Very good (bdb; 5,0): above 95% of maximum points
Good plus (+db; 4,5): 85% - 94% of maximum points
Good (db; 4,0): 75% - 84% of maximum points
Satisfactory plus (+dst; 3,5): 65% - 74% of maximum points
Satisfactory (dst; 3,0): 55% - 65% of maximum points
Unsatisfactory (ndst; 2,0): below 55% of maximum points