**SYLLABUS** (MODULE-ERASMUS+)

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| Course/module (as specified in the approved curriculum for the field of study) **Freshwater ecosystems** | ECTS**3** | Component code**ENVI 2.3** |
| Name in Polish **Ekologia wód śródlądowych** |
| Unit(-s) providing the course/module (Faculty, Institute/Department)**Faculty of Environmental and Mechanical Engineering, Department of Ecology and Environmental Protection**  |
| Hea**(**d of course/module (e-mail address)**Krzysztof Szoszkiewicz, Prof. (****krzysztof.szoszkiewicz@up.poznan.pl****)** |
| Other teachers**Daniel Gebler, PhD** |
| Course category**Open** | Language**English** | Level**Bachelor/Master** | Profile**Academic-general** | Semester**Winter/Summer** |
| **TYPE OF CLASSES/LECTURES AND THE NUMBER OF HOURS**(organised classes/lectures and self-study) |
| Type of studies: full-time |  | Type of studies: extramural |  |
| * Lectures
 | 15 | * lectures
 | - |
| * practical classes
 | 15 | * practical classes
 | - |
| * field exercise
 | 15  | * field exercise
 | - |
| * other lessons
 |  - | * other lessons
 | - |
| * self-study
 |  30 | * self-study
 | - |
| Total number of hours: | 75 | Total number of hours: | - |
| **PRE-REQUSITES**Basic knowledge in biology. |
| **OBJECTIVE OF THE COURSE**To understand structure and functioning of the various inland water ecosystems. The ecological relationships of rivers, streams and stagnant waters will be presented by taking into consideration their physical and chemical properties. Causes and consequences of human impact in terms of quality of aquatic ecosystems and water quality are included. Students gain basic knowledge on aquatic ecosystem degradation control and restoration. |
| **TEACHING METHODS**Lectures based on multimedia presentation with elements of discussion.Practical classes: individual project, exercises in laboratory, field trips.Possibility to use distance learning tools and techniques. |
| **LEARNING OUTCOMES** | Referenceto field outcomes |
| Knowledge | O1: Students have advanced knowledge in functioning of biotic and abiotic elements of the aquatic ecosystems, O2: Students understand mechanism, processes and relationships in various aquatic ecosystems,O3: Students has knowledge in the environmental engineering techniques to control the water degradation  | Notapplicable |
| Skills | O4: Students gain to evaluate quality and threats of aquatic environment,O5: Students have skills to define engineering problems and indicate proper solutions in individual projects,O6: Students are able to estimate advantages and weak elements of environmental protection and engineering technologies. | Notapplicable |
| Socialcompetences | O7: Students will be able to create and pass-on information about state of aquatic environment and its threats, O8: Students understand the importance of responsibility for the aquatic environment, being aware of the short- and long-term implications of the choice of different environmental engineering solutions. | Notapplicable |
| **METHODS TO VERIFY LEARNING OUTCOMES**Public presentation and written assignment.Reports from the field exercises.Written exam. | Outcome ReferenceNumbersO1, O2, O3, O4, O5, O6, O7, O8 |
| **TEACHING CONTENT****Lectures**Characteristics of the aquatic environment. Comparison between freshwater and marine ecosystems. Water resources in Poland. The diversity of aquatic ecosystems - characteristics of the main types of water sources, streams, rivers, estuaries, lakes and ponds. Abiotic factors in the waters: light conditions, temperature conditions, water movement. Water chemistry (gases, pH, salts, nutrients). Trophic types of waters. Environmental groups of aquatic organisms: plankton, nekton, benthos, periphyton, macrophytes, pleuston. Degradation of water in Poland and in other countries. Water quality systems. Contaminated water (basic concepts, causes, effects, the role of biological communities in shaping the quality of surface water). Major sources of pollutants to surface water. Degradation of surface water. Vulnerability to degradation. Eutrophication - the causes and ecological consequences. Non-trophic water threats. Water self-purification processes. Possible options of restoration of aquatic ecosystems.**Practical classes:**Laboratory training – physical and chemical analysis of water samples collected in several lakes and rivers.GIS training – water management data analysis, data processing, water catchment map preparation.**Field training:** Cybina river - biological methods of improving the condition of water ecosystems. Methods of reclamation and restorations of water ecosystems.Strzeszynskie Lake, Rosalka Lake, Swarzedzkie Lake, Glowna River, Bogdanka River, Samica River - structure of aquatic ecosystems, water quality measurements, water samples collection. |
| **Forms and criteria for passing of course/module** Public presentation. Written assignment. | Percentage of final mark50%50% |
| **LIST OF LITERATURE**1. Moss B. 2010. Ecology of freshwaters. A View for the Twenty-First Century. John Wiley & Sons.
2. Lampert W., Sommer U.: Limnoecology: Ecology and lakes and Streams. Oxford University Press, 2007.
3. Allan J.D., Castillo M.M.: Stream ecology Structure and function of running waters. Chapman and Hall, New York, 2007.
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