Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	**Freshwater Ecosystem**
Course code	43070
Scientific sector	AGR/08
Degree	Agricultural and Agro-Environmental Sciences
Semester	II semester
Year	Optional Course
Academic year	2019/2020
Credits	3
Modular	No

Total lecturing hours	18
Total lab hours	-
Total exercise hours	12
Attendance	Not compulsory
Prerequisites	Module “Introduction to Hydrology and Hydraulics”; Module “Biology of Microorganisms and Agro-environmental Microbiology”
Course page	-

Specific educational objectives	This course will introduce students to freshwater ecology with a focus on flowing water systems (i.e. rivers and streams). It will have a theoretical underpinning of the biota and basic ecological processes occurring in freshwater systems aimed at giving students the basis to engage in effective environmental management of European freshwater systems. The course gives a general overview of scientific contents and is designed for acquiring professional skills and knowledge.

Lecturer	Dr Andrea Andreoli, office K305 (building K, piazza Università 5, 3rd floor), andrea.andreoli@unibz.it, tel: +39 0471 017138, https://www.unibz.it/it/faculties/sciencetechnology/academic-staff/person/35911-andrea-andreoli Dr Silvia Pioli, office L6.02 (building L, piazza Università 3, 6th floor), silvia.pioli@unibz.it, tel: +39 0471 017684
Scientific sector of the lecturer	AGR/08
Teaching language	English
Office hours	On appointment
Teaching assistant (if any)	
List of topics covered	The course will cover the following topics:

	1. Course introduction; 2. Physiography of flowing water; 3. Fluvial Processess and fluvial morpholdynamics; 4. Riparian vegetation; 5. Sampling methods in freshwater ecosystems; 6. Type of aquatic organisms: Eukaryota and Prokaryota; 7. Freshwater microbiology 8. Evolution of organisms and biodiversity of freshwaters. 9. Development of biological indicators for the assessment of water resource quality 10. Role of aquatic organisms in the degradation of organic matter and pollutants
Teaching format	In this course the theoretical concepts are presented in class whereas practical activities are carried out in laboratory and field excursions. Students are required to work in group in the lab – under the supervision of the professor and of the TA – and prepare a report based on laboratory and field trip. Power Point presentations of the lectures will be made available on the Moodle website of the University (https://ole.unibz.it/), along with links to external resources and exercises.

Learning outcomes	On successful completion of this course, students will be able to: 1. Clearly articulate key approaches used to assess status and change in freshwater biological systems and describe the advantages, disadvantages and sources of uncertainty of these approaches; 2. Demonstrate well-developed conceptual knowledge in freshwater biology and ecology; 3. Collect new data and synthesis existing information to assess the status of a freshwater system. Critically evaluate the strengths and weakness of this data and information; 4. Accurately communicate the findings of a freshwater biological or ecological study in a scientific report; 5. Demonstrate ability to critically assess the quality of your own work and the work of others; and 6. Develop a global awareness of freshwater issues and the significance of cultural diversity as it pertains to sustainability of water resources.

	Knowledge and understanding (1) of water, sediment, vegetation and biota dynamics in freshwater ecosystem (primarily streams), (2) of the processes which shape the natural world at different temporal and spatial scales and their influence on and by human activities. *Applying knowledge and understanding through the development of some skills concerning*: (1) recognising and using subject-specific theories, paradigms, concepts and principles, (2) Analysing, synthesising and summarising information critically, including prior research, (3) Collecting and integrating several lines of evidence to formulate and test hypotheses, (4) the effective use of a spreadsheet to solve scientific problems and to process and present data in a graphical format (e.g., with Cartesian graphs), (5) the ability to obtain information from fieldwork and to integrate it together with the theoretical elements provided during the lessons. *Making judgements concerning:* (1) the choice of the most appropriate parameters for freshwater and hydrological analysis presented in a written report or in a oral presentation, (2) the address of basic and applied problems in fresh waters. *Communication skills* to present the learned concepts (topics and issues related to freshwater ecology) with a personal vocabulary that is precise, appropriate and pertinent to the subject. *Learning skills* of increasing the personal knowledge acquired during the course by reading technical documents and scientific articles and/or attending specific courses.

Assessment	Project work: individual 10 minutes oral presentation + development of a project report done in teamwork based on field surveys sampling.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Relevant for assessment of student reports: ability to use correct technical terminology, to present recent scientific results and to apply a critical thinking. Relevant for the oral presentation assessment are correctness and clarity of exposition, mastery of the technical language, capability to establish relationships between different topics.

Required readings	Schmutz A., Sendzimir. Riverine Ecosystem Management

	(Science for Governing Towards a Sustainable Future). SpringerLink, 2018. https://link.springer.com/book/10.1007/978-3-319-73250-3 (Selected Chapters) Sigee D.C. Freshwater Microbiology. Wiley, 2005. (Selected Chapters)
Supplementary readings	• Comiti F (2012) How natural are Alpine mountain rivers? Evidence from the Italian Alps. Earth Surf Process Landf 37:693–707. https://doi.org/10.1002/esp.2267 • Rinaldi, M., Surian, N., Comiti, F., Bussettini, M., Belletti, B., Nardi, L., ... & Golfieri, B. (2012). Guidebook for the evaluation of stream morphological conditions by the morphological quality index (MQI). *Version*, *1*, 85. http://www.isprambiente.gov.it/it/pubblicazioni/manuali-e-linee-guida/guidebook-for-the-evaluation-of-stream Additional sources will be communicated during the course.