



Course Specifications

Valid as from the academic year 2013-2014

Limnology (C001554)

Course size *(nominal values; actual values may depend on programme)*
Credits 5.0 **Study time** 135.0 h **Contact hrs** 40.0 h

Course offerings and teaching methods in academic year 2013-2014

A (semester 2)	lecture	22.5 h
	seminar: coached exercises	2.5 h
	group work	5.0 h
	practicum	10.0 h

Lecturers in academic year 2013-2014

Verschuren, Dirk	WE11	lecturer-in-charge
Vyverman, Wim	WE11	co-lecturer

Offered in the following programmes in 2013-2014

	crdts	offering
Master of Science in Marine and Lacustrine Science and Management	5	A
Master of Science in Marine and Lacustrine Sciences	5	A

Teaching languages

English

Keywords

Physical limnology, chemical limnology, continental waters, lakes and rivers, primary production, hydrologie, aquatic ecology, nutrient budget, stoichiometry

Level

advanced

Position of the course

The Biology Ma1 course 'Limnology' is taught to students majoring in Ecology, and as optional course to students in other majors. 'Limnology' is a pre-eminently system-directed course in which equal attention is given to the physical, chemical and biological components of lacustrine ecosystems, and hence requires prior knowledge of basic inorganic chemistry. The biological-ecological course content builds on introductory knowledge obtained in Ba1 course 'Ecology', and more advanced material presented in Ba3 'Aquatic Ecology' and (as case studies) Ba3 'Community and Ecosystem Ecology'. Specific to 'Limnology' is its focus on physical and chemical (generally, abiotic) controls on the structure and productivity of aquatic communities, and on the role of aquatic biota in the functioning and nutrient budget of the local ecosystem.

The principal objective of 'Limnology' is to provide students with advanced insight in the structure and functioning of continental aquatic ecosystems of all major types and from all climate regimes worldwide.

Competence fields for master in marine and lacustrine sciences: M.1.1, M.1.5, M.2.2, M.2.6.

Contents

- 1) Structure and function of continental aquatic ecosystems with equal attention to physical, chemical, and biological/ecological processes, and including basin hydrology. Physical limnology starting from first principles of basin morphometry, temperature, density stratification and wind strength. Chemical limnology with focus on redox conditions in the water column and on the lake bottom, and on nutrient balance with processes of input, loss, and recycling.
- 2) Elaboration of contrasts in the chemical and physical limnology of rivers, wetlands, lakes and ponds both in temperate Europe and in tropical, polar and high-mountain

regions as determinants of local aquatic biology and ecology. 3) Advanced aquatic ecology with emphasis on the ecological role of diverse groups of aquatic biota; roles of stoichiometry, classic and alternative food chains in ecosystem functioning, and bottom-up vs. top-down controls on aquatic productivity.

Initial competences

Ba1 General Chemistry I and II; Ba1 Ecology; Ba3 Community and Ecosystem Ecology; Ba3 Aquatic ecology

Final competences

Demonstrate advanced multidisciplinary insight in the physical, chemical, hydrological and biological functioning of lakes and rivers at the system level, applicable to continental aquatic ecosystems of all types and regions worldwide.

Show ability to sketch the biology (and her seasonal patterns) and dominant nutrient-cycling processes of any arbitrary lake from a limited number of physical and chemical field measurements.

Display critical insight in evaluating the relevance and applicability of data gained from laboratory and mesocosm experiments to ecosystem functioning in the real world.

Demonstrate ability to process, combine, evaluate, and synthesize in a structured manner complex information from the primary scientific literature of multiple relevant sub-disciplines.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, lecture, practicum, seminar: coached exercises

Extra information on the teaching methods

Lectures: Powerpoint presentations with figures and text

Practical exercises: field- and labwork on measuring techniques for dissolved oxygen, acidity (pH), alkalinity and transparency

Seminar guided exercises: quiz in class

Teamwork: analysis of data obtained in the practical exercises, reported on in a Powerpoint presentation

Learning materials and price

English handbook 'Limnology: inland water ecosystems' by Jacob Kalff (2001, Prentice Hall; student price 71€). Powerpoint presentations, made available via Minerva (~220 pp. = 11€), summarize the course content; primary scientific literature available via Minerva (~60pp. = 3€). Cost: 85 EUR

References

Recommended primary literature on selected topics.

Course content-related study coaching

- 1 Moderation/supervision of practical exercises in which an interactive quiz with multiple choice questions is used to enhance insight in the course material.
- 2 Supervision/feedback of group task on limnological techniques for measurement/determination of e.g. primary productivity, nutrients and dissolved oxygen, phytoplankton community composition, and streamflow.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Written examination with open questions, assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

Non-periodical evaluation: group task: content and form of PPT presentation including Q&A-session afterwards.

Periodical evaluation: final exam: questions test knowledge as well as understanding of lecture material, problem solving on quantitative aspects of stratification, nutrient budget or aquatic productivity; closed-book written exam.

Calculation of the examination mark

Periodical examination 75%; group work 15%, presentation and Q&A session 10%