



Programme syllabus

Faculty of Health and Life Sciences

Akvatisk ekologi, masterprogram, 120 högskolepoäng

Aquatic Ecology, Master Programme, 120 credits

Level

Second Level

Date of Ratification

Approved 2009-09-15

Revised 2019-09-19 by the Faculty Board within the Faculty of Health and Life Sciences

The programme syllabus is valid from spring semester 2020

Prerequisites

General entry requirements for secondcycle studies and specific entry requirements:

- 90 credits in Biology/Ecology/Microbiology including an independent project/degree project worth at least 15 credits or the equivalent.
- English B/6 or equivalent.

Description of Programme

The Master of Science in aquatic ecology is at secondlevel, equivalent to 120 higher education credits. The program is designed to prepare professionals interested in the field of aquatic ecology and sustainable use of aquatic ecosystems. The program provide knowledge and skills for a career in education, research and innovation as well as entrepreneurs, decision makers and consultants within the aquatic field. The program is international, multidisciplinary and oriented towards current topics in aquatic and marine ecology, aquatic resources, coastal monitoring and environmental policies.

Objectives

Central degree objectives in accordance with the Higher Education Ordinance

Knowledge and understanding

For a Degree of Master (Two Years) students must:

- demonstrate knowledge and understanding in their main field of study, including both broad knowledge in the field and substantially deeper knowledge of certain parts of the field, together with deeper insight into current research and development work,
- demonstrate deeper methodological knowledge in their main field of study.

Skills and abilities

For a Degree of Master (Two Years) students must:

- demonstrate an ability to critically and systematically integrate knowledge and to analyse, assess and deal with complex phenomena, issues and situations, even when limited information is available,
- demonstrate an ability to critically, independently and creatively identify and formulate issues and to plan and, using appropriate methods, carry out advanced tasks within specified time limits, so as to contribute to the development of knowledge and to evaluate this work,
- demonstrate an ability to clearly present and discuss their conclusions and the knowledge and arguments behind them, in dialogue with different groups, orally and in writing, in national and international contexts,
- demonstrate the skill required to participate in research and development work or to work independently in other advanced contexts.

Judgement and approach

For a Degree of Master (Two Years) students must:

- demonstrate an ability to make assessments in their main field of study, taking into account relevant scientific, social and ethical aspects, and demonstrate an awareness of ethical aspects of research and development work,
- demonstrate insight into the potential and limitations of science, its role in society and people's responsibility for how it is used,
- demonstrate an ability to identify their need of further knowledge and to take responsibility for developing their knowledge.

Program-specific objectives

After successfully completing the programme for a Degree of Master the student should be able to:

- understand and apply the principles of Aquatic Ecology including the dynamic processes that affect aquatic organisms in coastal ecosystems,
- demonstrate knowledge of water systems from freshwater streams to marine areas,
- demonstrate skills in how to perform laboratory and field work in the Aquatic Ecology field,
- use the knowledge in Aquatic Ecology, integrate it with those of other disciplines, and contribute to the development of sustainable technologies.

Content

Programme overview

The programme's content and setup are designed to develop the students' knowledge of aquatic ecology at second-cycle level. For each student, an individual course of study is planned in consultation with the programme director, including mandatory and elective courses as well as project courses. In the plan, previous knowledge and experience as well as the student's aims with the programme are taken into account. The contents of the project courses are mapped out and, where appropriate, courses at other universities are planned. The language of instruction is English but all courses can be given in Swedish if only Swedish students participate.

Programme content

During the first year, students are introduced to current research and knowledge development in aquatic ecology and will deepen their knowledge of marine microbiology, molecular ecology, aquatic and marine resources management, coastal monitoring, and biological solutions to environmental problems. The function and evolution of different aquatic systems ranging from polar to tropical and from coastal to deep ecosystems are discussed in the light of the newest molecular advances in the field. Students are also introduced to simulation modelling and ecological applications that can offer solutions to complex management problems of water resources. Relevant both for research and management, the introduction to powerful techniques for designing ecological investigations and analysing monitoring data sets enables the students to tackle environmental issues within the field.

Within the framework of the programme the students are offered a range of introductory or in-depth courses on advanced techniques (eg. statistics, bioinformatics, ecology), management issues (governance, resources management including fisheries, sustainability, business) or global change and climate related topics (ecology, toxicology and socioeconomic impact of harmful algae, spreading of pathogens, bioenergy). The student may design, together with programme coordinator and examiner, project courses to fit a specific track. During the two years, students participate in a series of seminars with researcher on current topics within the field of aquatic ecology.

During the second year of the programme the student completes a degree project encompassing 30, 45 or 60 higher education credits; remaining credits (0-30 depending on the length of the degree works) are taken as project courses. The degree project is conducted in a subject area related to current research conducted at the Linnaeus University Centre for Ecology and Evolution in Microbial model Systems (EEMiS). The work may also be conducted at a partner university or with a third party (e.g. Board of Fisheries, national/regional environmental planning agencies, private sector) or as a Minor Field Study. The degree project may partly be conducted in another country, as agreed between student, supervisor and examiner.

Courses in the programme

Year 1

Research Methodology in the Natural Sciences (A1N) 15 higher education credits*. *Mandatory*

The course aims to further develop and gain an understanding of the research methods that are used in the natural science research field. The course includes elements that cover the general approaches used within research, from hypothesis testing to evaluation and synthesis.

Introduction to Research in Aquatic Ecology (A1N) 7.5 higher education credits*. *Mandatory*

The course aims to provide an introduction to current research in the field Aquatic Ecology.

Molecular Ecology (A1N) 7.5 higher education credits*. *Mandatory*

The student acquire skills with in specific methodology, such as molecular genetics and they are applied to ecological research questions. The main team of the course is to visualize the importance of molecular methods to understand ecological processes, such as selection, population differentiation and speciation.

Project Course in Aquatic Ecology I (A1N) 15 higher education credits*.

The course aims to deepen and broaden knowledge of the subject aquatic ecology through a literature study of current research literature.

Project Course in Aquatic Ecology II (A1F) 15 higher education credits*.

The course aims to deepen and broaden knowledge of the subject aquatic ecology through a literature study of current research literature as well as develop the skills and ability to apply this knowledge.

Year 2

Project Course in Biology (A1F) 15 higher education credits*.

The course aims to deepen and broaden knowledge of a subject field in the main field of study, biology. Will not be taken if the student writes a degree project worth 45 or 60 higher education credits.

Project Course in Aquatic Ecology III (A1F) 15 higher education credits*.

The aim of the course is for the student to practice skills within experimental methodology and develop an understanding of aquatic ecology. Will not be taken if the student writes a thesis project worth 60 higher education credits.

Degree Project in Biology (A2E) 30, 45 or 60 higher education credits*.

Mandatory

The course aims to give a deeper understanding in a subject within the main field of study, biology, as well as train the student's analytical and laboratory skills and the ability to write a scientific work. As the number of higher education credits increase the following also increase: a) the scope and depth of the questions, b) the scope and depth of the literature relevant to the subject c) the scope and depth when it comes to processing data and statistical analyses, and d) the scope and depth of the scientific synthesis that is the core of the degree project.

*course in main field (Biology)

In order to complete year 2, the student must have completed a minimum of 60 higher education credits, of which 30 may be obtained in another field of study, in consultation with the programme coordinator.

Relavance for society

The Masters Program Syllabus provides the student with scientific skills useful outside academy and possibilities to develop network and employability. The student also have the possibility to perform degree project work in a non-academic organization.

Internationalization

The student has the opportunity to participate in courses and perform parts of the degree project abroad. Elective courses may be taken at other universities in Sweden. Courses can be taken at other universities after agreement between the student and the programme coordinator.

Perspective in the programme

The Masters in Aquatic Ecology is organized according to the principles of sustainability (integration, community involvement, gender and generation equity, ecological integrity and continual improvement). The theoretical training in the program favors ecological integrity, by protecting biological diversity and maintaining ecological processes and life support systems in aquatic environments. Practical training takes into account concrete aspects of ecological integrity (learning environment, travelling, materials, e-learning). The Masters in Aquatic Ecology also introduces the students to the concept of fairness and equal access to opportunities both in our life-time and for future generations. Equity between generations implies maintaining ecological integrity and water resources to provide for a safe quality of life, both for short and long term. The program incorporates both global and multicultural perspectives on aquatic systems and water resources, on new technology and development and on internationalization and employability.

Quality Development

Quality control work is undertaken according to the guidelines drawn up by the Faculty of Health and Life Sciences and the Department of Biology and Environmental Science. Course evaluation results are compiled in a course report and archived by the department's administration. The results of the evaluations and any changes made in the implementation of a course or its syllabus are communicated to the head of department and presented to the students the next time the course is given. Results and suggestions for improvements are discussed in a programme board (consisting of an external representative, teachers and students) and programme committee (consisting of examiners, course coordinators and programme coordinator) which provide support for the programme's development and quality assurance. The master programme is given in close cooperation with the LNU Centre of Excellence EEMiS which guarantees that teachers active in research can contribute to the quality development of the programme.

Degree Certificate

After completing program studies, corresponding to the requirements expressed in the Higher Education Ordinance degree order as well as Linnaeus University degree order, the student may apply for a degree. Those who have completed the Study Programme Master of Science in Aquatic Ecology may obtain the following degree:

Filosofie masterexamen med inriktning mot Akvatisk Ekologi.
Huvudområde: Biologi.

Master of Science (120 credits) with specialization in Aquatic Ecology.
Main field of study: Biology.

The degree certificate is bilingual (Swedish/English). The Degree Certificate is accompanied by a Diploma Supplement (English).

Other Information

The student can, after the first year (60 higher education credits) apply for a one year Master Degree on condition that project course in Aquatic Ecology II (A1F) 15 higher education credits is replaced by a degree project for a one year Master Degree in Biology, 15 higher education credits and that the general requirements for a one year Master Degree are met. In that case the degree will be Master of Science in Biology with specialization in Aquatic Ecology, one year (filosofie magister i biologi, inriktning Akvatisk ekologi).