



## Programme syllabus

Faculty of Health and Life Sciences

Evolutionär Ekologi, masterprogram, 120 högskolepoäng

Evolutionary Ecology, Master Programme, 120 credits

### Level

Second Level

### Date of Ratification

Approved by the Faculty Board within the Faculty of Health and Life Sciences 2020-10-22

The programme syllabus is valid from autumn semester 2021

### Prerequisites

General entry requirements for secondcycle studies and specific entry requirements:

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

### Description of Programme

The Master of Science in evolutionary ecology is a programme at advanced level, equivalent to 120 higher education credits. The programme is designed to help the student develop curiosity, knowledge of current research, and a deepened understanding of evolutionary ecology with focus on the organismal diversity, evolution, ecology and behaviour. The programme aims to provide insights into how research findings can be implemented and contribute to conservation of biodiversity, and to better informed management and sustainable utilization of ecosystems, species and populations.

The programme prepares students for a future career in research and education. After having completed the programme, the students should also have attained skills and expertise for qualified work tasks as decision makers and consultants within public authorities and the private sector.

### 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; and
- 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; and
- 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; and
- demonstrate an ability to identify their need of further knowledge and to take responsibility for developing their knowledge.

## **Content**

### **Programme overview**

The Master of Science in evolutionary ecology is a programme at advanced level, equivalent to 120 higher education credits. The programme is designed to help the student develop curiosity, knowledge of current research, and a deepened understanding of evolutionary ecology with focus on the organismal diversity, evolution, ecology and behaviour. The programme aims to provide insights into how research findings can be implemented and contribute to conservation of biodiversity, and to better informed management and sustainable utilization of ecosystems, species and populations. The programme prepares students for a future career in research and education. After having completed the programme, the students should also have attained skills and expertise for qualified work tasks as decision makers and consultants within public authorities and the private sector.

### **Programme content**

During the first year, students are introduced to research, theory and methods in the field of evolutionary ecology and related disciplines. The programme gives the students the opportunity to deepen their knowledge in organismal biology, with focus on diversity, systematics, evolution, ecology and behaviour. Students also have the opportunity to develop their understanding and skills within microbiology, molecular ecology and related fields.



The programme will provide insights into how research findings can be implemented and contribute to the conservation of biodiversity and sustainable utilization of species and populations. Some course and teaching activities will be taken together with students in other master programmes in biology. Together with seminars and workshops arranged within the frameworks of Linnaeus University Centres and Knowledge Environments (e.g. EEMiS), this will contribute to an interdisciplinary learning environment with potential for interaction and collaboration between students and researchers. Insights into how to design scientific studies and analyse data from observational and experimental investigations will prepare students for conducting, accessing, understanding, and evaluating research within the field, skills which are all of relevance for science, management and decision making. The programme offers a wide range of introduction and/or advanced level courses within advanced techniques and theory (e.g. statistics, bioinformatics, ecology), management (issues related to protection and management of organisms, sustainable resource use, and socioeconomics) as well as global change and climate related topics (ecology, changes in size, dynamics and distribution of organisms). In consultation with the program coordinator/supervisor and approval by the examiner, there is the opportunity for students to design their own project courses within the existing scientific expertise of the institution. During the two year Master programme, students will participate in a series of seminars within the focal subject area.

The second year focuses on a research project including a written degree project comprising 30, 45 or 60 higher education credits (the remaining credits, depending on the credits of the degree project, will be assigned to project courses). The degree project is carried out in a field related to ongoing research within the relevant Linnaeus University Centres and Knowledge Environments (e.g. EEMiS)). The degree project can also be carried out at a partner university, a third party or as a Minor Field Study. The degree project can partly be carried out abroad after agreement between the student, the advisor and the examiner.

It is possible to apply for the degree of Master (1 year) in Evolutionary ecology in which case a degree project encompassing 15 credits is completed during the second term of the programme.

### **Programme courses**

#### **Year 1**

##### *Autumn semester*

#### **Research Methodology (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 6 subcourses with the following content: philosophy of science, research ethics, literature searching, quantitative research methods in the natural sciences, oral presentation skills, and laboratory safety and qualitative methods. Main field of study: Biology.

#### **Introduction to Research in Evolutionary Ecology (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 with emphasis in evolutionary ecology. The course includes fundamental aspects of organismal ecology, evolution and diversity. Main field of study: Biology.



**Molecular Ecology (A1N) 7,5 higher education credits. *Mandatory.***

The course provides an introduction to, and practical skills of, research in molecular ecology with focus on evolutionary ecology. The main aim is to convey the fundamental value of molecular methods in understanding evolutionary processes such as selection, population differentiation and speciation. Main field of study: Biology.

*Spring semester*

**Project Course in Evolutionary Ecology I (A1F) 15 higher education credits.**

The course aims to enhance the understanding of the literature that forms the basis for organismal ecology and evolution. The course uses international articles and other literature sources of significance to the subject area. Main field of study: Biology.

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

The course provides a deeper and broaden knowledge and understanding of the literature that forms the basis for organismal ecology and evolution, as well as show the skills and ability to apply this knowledge. The course uses international articles and other literature sources of significance to the subject area with regard to scientific applications such as presentations, posters and written syntheses. Main field of study: Biology.

Year 2

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

The course aims to deepen and broaden the knowledge of a subject field in the main field of study, biology, as well as show the skills and ability to apply this knowledge. 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 Evolutionary 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 organismal evolution, diversity and ecology. Main field of study: Biology. 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. Main field of study: Biology.

To complete year two, the student must obtain a minimum of 50 higher education credits of which 30 higher education credits can be selected freely, but courses should be chosen after advice and approval by the Program Coordinator.

**Societal relevance**

The Master Programme Syllabus comprises several courses that ensure training and experiences from outside academia, to develop the student's network and promote employability. The degree project can be carried out at a nonacademic external organisation/institution after agreement between the student and the examiner.



## Internationalization

Students have the opportunity to replace mandatory courses with courses of equivalent content at other universities in Sweden or abroad. Elective courses can be chosen from foreign courses after agreement with the programme manager. The degree project can be carried out at a foreign institution after agreement between the student and the examiner.

## Scope of the programme

The Master Programme Evolutionary Ecology is organized according to the principles of sustainability (integration, community involvement, gender and generation equality, ecological integrity and continual improvement). The theoretical training in the programme aims to help the student develop knowledge that can be used for protecting biological diversity and maintaining ecological processes and systems. Practical training takes into account concrete aspects of ecological sustainability (learning environment, travelling, materials, elearning).

The programme 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 that biological systems and ecological processes are maintained to provide for a safe quality of life, in both the short and the long term. The programme incorporates both global and multicultural perspectives, and takes into consideration internationalisation 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 and program evaluation results are compiled in written reports and archived by the department's administration. The results of the evaluations and any changes made in the implementation of a course or the programme and their syllabuses 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 completion of studies that correspond to the requirements stated in the Higher Education Ordinance and those stated in the local degree ordinance at Linnaeus University, the student can apply for a degree. Those who have completed the programme Evolutionary Ecology, Master Programme can obtain the following degree:

Filosofie masterexamen med inriktning mot Evolutionär ekologi. Huvudområde: Biologi.

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

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

## Other Information

After completing half of the programme the student can apply for a one year Master

Degree on condition that the project course in Evolutionary Ecology II (A1F) is replaced by a degree project for a one year Master Degree in Biology, 15 credits and that the general requirements for a one year Master Degree are satisfied.

In that case the degree will be: Master of Science (60 credits) with specialization in Evolutionary Ecology. Main field of study: Biologi

Filosofie magisterexamen med inriktning mot Evolutionär ekologi Huvudområde: Biologi.