About Choosing Courses for the Master's Program: Advice and Rules

To ensure that you meet the academic prerequisite requirements for participation in the more advanced master's courses, it is recommended that you already consider your academic interests / wishes for the master's program when choosing bachelor's courses.

Remember that you must have approved a master's contract with your program of study by your education manager in biology before you enroll in the courses.

If you are traveling abroad, you must take the ECTS you need to obtain a 30 ECTS specialization at a foreign university. The courses are chosen within the chosen field of specialization.

The requirement for a 30 ECTS specialization lapses if you

- is in the process of a secondary education (secondary education)
- completes a 30 ECTS option in another program
- conducts a semester of Arctic courses in Nuuk (http://studerende.au.dk/studier/fagportaler/biologi/mit-studieliv/vis/artikel/arktisk-semester/).

Below is a list of constituent courses from which to choose 30 ECTS as well as optional recommended courses that support each of the three specializations. Prerequisite requirements are also stated.

Please note that individual courses may be compulsory if you wish to complete a thesis within specific subject areas. Such requirements appear in the specializations described. If you are interested in information about special opportunities at the Institute's research units, you can visit their websites at https://bios.au.dk/

Please also note the following Biology courses, which are not included in any of the three specializations:

- Tropical ecosystem management and human security
- Politics and economics in nature and environmental management
- Advanced water cycle management
- Nuuk courses
- Biological project work
- Commercial Project
- Bio-entrepreneurial
The connection between specialization and career opportunities

The three specializations of the Master's program prepare you to face the challenges that a rapidly developing labor market poses to you as a biologist. They each provide you with a solid professional foundation to analyze and act in a changing world. Through learning experimental methods and analyzing and interpreting data, they provide you with the practical and theoretical tools needed to gain new biological knowledge, disseminate it to others and apply it in practice. Whether you want to work with management, dissemination, research, innovation - or something completely fifth - as a trained biologist, choosing a particular specialization is not crucial to your future work. The key to your choice should always be your interests and what you are passionate about.

Specializations and course offerings

Ecophysiology

In this specialization, physiological processes, metabolic functions and underlying functional mechanisms of all living organisms are in focus. Central is the question of how the physiology of organisms at the organism, organ, cell and molecular level is influenced by their surrounding environment. The subjects that support this specialization thus help to give you a thorough understanding of the mechanisms underlying the functioning of organisms in the environment in which they live, along with an understanding of their evolutionary adaptation and their response to stress and changing environments. The specialization includes opportunities to qualify for a career in medical research.

Keywords: energy flow and preservation, metabolism, respiration, cold and heat tolerance, phenotypic plasticity, evolutionary adaptations, stress

Prerequisites:

At least two of the following bachelor courses:

- Microbial physiology and identification (Autumn, 10 ECTS)
- Ecotoxicology (Autumn, 10 ECTS)
- Applied programming (Fall-Q1, 5 ECTS)
- Conservation genetics and molecular ecology (Autumn, 10 ECTS) revised and offered from 2021
- Ecophysiology of plants (Spring, 10 ECTS)
- Animal Ecophysiology (Spring, 10 ECTS)
Constituent courses from which 30 ECTS are selected:

- Experimental evolutionary biology (Autumn, 10 ECTS)
- Conservation physiology (Autumn, 10 ECTS)
- Interaction between microbes and their host organisms (Autumn, 10 ECTS) (MOL)
- Molecular Microbiology (Spring, 10 ECTS)
- Experimental Physiology (Spring, 10 ECTS)
- Concepts and Design of Metabolism (Spring, 10 ECTS) (MOL)
- Plant Biology and Biotechnology (Spring, 10 ECTS) (MOL)

Recommended courses:

- Bioinformatics Analysis of Genomics Data (Autumn, 5 ECTS) (MOL)
- Experimental Aquatic Ecology (Spring, 10 ECTS)
- Tree of Life (Autumn, 10 ECTS) (BiRC)
- Advanced Genome Analysis (Autumn, 10 ECTS) (BiRC)
- Population Genetics on Genomes (Spring, 10 ECTS) (BiRC)
- Cell biology in health, aging and disease (Spring, 10 ECTS) (MOL)

Biodiversity and Evolution

With a focus on populations, species and ecosystems, this specialization deals with gene-to-ecosystem-level processes that determine the distribution of biodiversity. An understanding of diversity is gained here by interconnecting our knowledge of interactions between species and their surrounding environment, evolutionary processes and adaptations. The latest technologies and methods such as GIS (geographic information systems) and eDNA (environmental DNA) are used to understand and manage biological diversity on a local as well as global scale.

**Keywords:** Population genetics and genomics, evolutionary ecology, phylogenetics, biogeography, ecosystem dynamics, adaptation, macroecology, species formation, management, nature conservation, behavioral biology, global change

**Prerequisites:**
At least 10 ECTS of the following bachelor courses

- Conservation genetics and molecular ecology (Autumn, 10 ECTS)(under revision, offered from 2021)
- Applied programming (Fall Q1, 5 ECTS)
- Geographic information systems (Autumn Q2, 5 ECTS)
- Behavioral Biology (Spring 10 ECTS)
- Danish flora and vegetation (Spring, 10 ECTS)
• The Ecology and Diversity of Arthropods (Summer 5 ECTS)

**Constituent courses:**

• Tree of Life (Autumn, 10 ECTS) (BIRC)
• Experimental evolutionary biology (Autumn, 10 ECTS)
• Biogeography and Macroecology (Autumn 10 ECTS)
• Microbial metabolism and population ecology (Autumn 10 ECTS)
• Statistical and geospatial modeling (Autumn 10 ECTS)
• Fauna ecology and adaptive management (Spring 10 ECTS)
• Molecular Microbiology (Spring 10 ECTS)
• Global change (Spring 10 ECTS) (under preparation, planned from 2021)

**Recommended graduate courses:**

• Advanced zoological field course, summer, 5 ECTS
• Identification of animals and plants in lakes and streams, summer 5 ECTS
• Advanced Genome Analysis (Autumn 10 ECTS) (BiRC)
• Population Genetics on Genomes (Spring 10 ECTS) (BiRC)

---

**Ecology**

This specialization includes subjects that deal with the composition and function of terrestrial, fresh and marine ecosystems and their management. A basic theme is the biological and physicochemical conditions of ecosystems and their importance for the activity, distribution and interaction of organisms. Emphasis is placed on important ecosystem processes such as primary and secondary production and energy and nutrient turnover, and the factors that influence these processes in nature. Furthermore, the focus is on the management, restoration and restoration of ecosystems.

**Keywords:** Energy and metabolism, ecosystem structure, biotic and abiotic interactions, functional ecology, management, ecological modeling, global change, organism awareness

**Prerequisites:**

At least two of the following courses (see prerequisites in course descriptions):

• Geographic Information Systems (Autumn Q2 5 ECTS)
• Aquatic Biology (Autumn 10 ECTS)
• Management of Danish nature and environment (Autumn 5 ECTS)
• Danish flora and vegetation (Spring 10 ECTS)
• Microbial ecology (Spring 10 ECTS)

**Constituent courses:**

• Biogeography and Macroecology (Autumn 10 ECTS)
• Fresh ecosystems (Autumn 10 ECTS)
• Microbial metabolism and population ecology (Autumn 10 ECTS)
• Management of aquatic ecosystems (Autumn 10 ECTS)
• Statistical and geospatial modeling (Autumn 10 ECTS)
• Marine ecosystems (Spring 10 ECTS)
• Experimental Aquatic Ecology (Spring 10 ECTS)
• Global change (Spring, 10 ECTS) (under preparation, planned from 2021)

**Recommended courses:**

• Conservation physiology (Autumn 10 ECTS)
• Environmental modeling (Autumn 10 ECTS)
• Fauna ecology and adaptive management (Spring 10 ECTS)
• Identification of animals and plants in fresh water (summer 5 ECTS)
• Advanced water cycle management (summer 5 ECTS)