Faculty of Science

BIOS16, Biology: Soil and Plant Ecology, 15 credits

Biologi: Mark- och växtekologi, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by The Education Board of Faculty of Science on 2025-06-09. The syllabus comes into effect 2025-06-09 and is valid from the autumn semester 2026.

General information

The course is an elective course for advanced studies for a Bachelor of Science or Master's degree (120 credits) in biology or environmental sciences.

Language of instruction: English

Main field of study	*Specialisation*
Biology	A1N, Second cycle, has only first-cycle course/s as entry requirements
Environmental Science	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The overall aim of the course is that the student develops an understanding for the ecological processes that underlie the fertility of terrestrial ecosystems, including the planet's biogeochemical cycles of carbon and nutrients and how human activities alter these processes.

Knowledge and understanding

The student should be able to on completion of the course:

- describe in detail how the soil environment, which forms the basis for terrestrial plants and terrestrial biodiversity, was formed through the interaction between chemical, geological, and biological processes
- explain in detail how the ecological interaction between soil organisms and plants creates fertility in terrestrial ecosystems

- describe the ecological and biogeochemical processes that determine where soil organisms and plants are found and how this entails various ecosystem functions
- explain in detail how the interaction between soil organisms and plants controls the turnover of carbon and nutrients in terrestrial ecosystems
- explain in detail how interactions between organisms above and below ground affect the structure and function of different ecosystems, including the importance of biodiversity for the function of ecosystems
- explain in detail how symbioses between plants and mycorrhizal fungi affect plant nutrient uptake, soil carbon storage, and the ecology of fungi
- explain in detail how the biology that controls soil biogeochemistry is affected by climate and environmental changes, and the repercussions this has on the climate

Competence and skills

The student should be able to on completion of the course:

- apply methodology used in soil and plant ecology research to analyze and quantify concentration and turnover rate of carbon and nutrients, microbial biomass and its composition, and composition of soil food webs
- test ecological theory by searching, analyzing, and compiling scientific texts and data
- compile, interpret, and present results from laboratory work in soil and plant ecology
- write scientific reports

Judgement and approach

The student should be able to on completion of the course:

- evaluate and critically review soil and plant ecological information from literature and digital media
- evaluate ecological theory based on evidence from soil and plant ecological observations and measurements
- evaluate how soil and plants affect environmental and climate change, and how biological factors can amplify or mitigate this impact

Course content

The course covers the following areas:

- soil formation processes
- soil ecology, the basis of the terrestrial ecosystem
- the importance of biological, chemical and geological processes for soil and plant communities
- biological processes that give rise to carbon, nitrogen, phosphorus and other nutrients

- relationship between biological diversity and function in soil and plant ecosystems
- the importance of plants and soil organisms for the production and consumption of greenhouse gases
- the role of soil in environmental change
- human impact on soil and plant ecosystems

The course also includes excursions and an extensive laboratory work, when modern research methods are used to investigate the impact of various factors on soil and plant communities and evaluate soil ecology.

Course design

The teaching consists of lectures, exercises, seminars, laboratory sessions, excursions and project work, individually and in groups, as well as a mini-conference ("Research frontiers"). The lectures support the self-studies required during the course. Participation in exercises, seminars, laboratory sessions, excursions and project work and thereby other integrated teaching is compulsory.

Assessment

Examination takes place through a written examination, three written project reports, and through active participation in compulsory exercises, seminars, laboratory sessions and excursions during the course. For students who have not passed the regular examination, an additional examination in close connection to this is offered.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
To pass the entire course, approved examinations, approved project as well as approved participation in exercises, seminars, labs and excursions, are required.

The grading scale for Written examination and Project is Fail, Pass, Pass with distinction, whereas the grading scale for exercises, seminars, labs and excursions is Fail, Pass.

The final grade is decided by the weighed results of Written examination and Project.

Entry requirements

For admission to the course, 105 credits of studies in natural sciences are required including knowledge equivalent to BIOC13 Ecology 15 credits, or NGEA04 Ecosystem analysis 15 credits. English 6/B

Further information

The course may not be included in a degree together with the course BIOR78 Soil and Plant Ecology 15 credits.

The course is offered at the department of Biology, Lund University.