Faculty of Science

NGEN42, Physical Geography: Ecosystem Modeling, 15 credits

Naturgeografi: Ekosystemmodellering, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2023-05-30 to be valid from 2023-05-30, spring semester 2024.

General Information

The course is compulsory at the second-cycle level for a Degree of Master (120 credits) in geographic information science and remote sensing for modelling and environmental monitoring (GEM), computational science with a specialisation in physical geography and computational science with a specialisation in earth sciences. The course is an elective course at the second-cycle level for a Degree of Master of Science (120 credits) in physical geography and ecosystem science with a specialisation in physical geography and ecosystem science with a specialisation in environmental changes at higher latitudes (EnCHiL) and for the general specialisation. The course can also be offered as a freestanding course.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Computational Science	A1N, Second cycle, has only first-cycle course/s as entry requirements
Physical Geography and Ecosystem Science with specialization in Environmental Changes at Higher Latitudes	A1N, Second cycle, has only first-cycle course/s as entry requirements
Physical Geography and Ecosystem Science	A1N, Second cycle, has only first-cycle course/s as entry requirements
Applied Computational Science	A1N, Second cycle, has only first-cycle course/s as entry requirements
Geo-Information Science and Earth Observation for Environmental Modelling Management	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that the student, on completion of the course, should have acquired knowledge on how to create, use and interpret result of ecosystem models. This implies that the student masters both the theoretical background and the practical skills that are needed to model different processes in an ecosystem. Simulation models are important tools within the environment sector, where they are used to produce basic foundations for political decision making and planning related to the environment. In a research context, modelling is used to describe complex systems and to increase the understanding of these.

Knowledge and understanding

On completion of the course, the student should be able to:

- account for the general principles and methods to define, parameterize and evaluate ecosystem models,
- account for some of the various types of process-oriented models that are used within ecosystem and environmental research and planning, their general properties and their advantages and limitations,
- design an ecosystem model in the form of a computer program,
- account for how models and model results could be used in different applications connected to the environment.

Competence and skills

On completion of the course, the student should be able to:

- present various types of modelling results both orally and in written format,
- lead and summarise discussions during seminars and group work
- summarise and visualise results from models,
- lead a group assignment to solve scientific or applied problems by means of models.
- demonstrate ability to, within the subject area, seek relevant information in articles, reports and other scientific literature.

Judgement and approach

On completion of the course, the student should be able to:

- analyse various types of problems related to the environment and develop methods to handle these by means of existing models and appropriate input data and validation data,
- critically review, evaluate and interpret results of models
- design, parameterize, evaluate and apply a process-oriented mathematical model of an ecosystem or one of its components.

Course content

The course treats some of the various types of process-oriented models that are used within ecosystem and environmental research and other relevant sectors. Further, principles, methods and tools to define, parameterize, evaluate and apply models and the visualisation and interpretation of their results with regard to underlying assumptions and uncertainties are also treated. Connections are made to sector-relevant issues and to current application fields in for example research,

environmental administration and other relevant sectors. Exercises in the use of computer-based analysis and presentation tools, information retrieval and oral and written presentation techniques are included as a part of certain learning activities.

Course design

The teaching consists of lectures, seminars, group work and project work. Oral presentation is included as a part of certain exercises and project work. Participation in seminars, group work and project work and thereby integrated other teaching is compulsory.

Assessment

Assessment consists of a written exam at the end of the course as well as of oral and written presentations of hand-ins and a project 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.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.
For a Pass grade on the whole course, the student must have Pass grade in written exam. Passed grade on the entire course assumes participation in all compulsory parts.

The grading scale for written examination and project report is Failed, Passed, Passed with distinction.

The final grade is decided through a weighted mean of the results in the components that are included in the examination; 50% examination, 30% project work, 20 % written assignments.

Entry requirements

Admission to the course requires general entry requirements, English 6/B and at least 90 credits scientific studies, of which at least 7.5 credits should be in physical geography, ecosystem science, or the equivalent.

Further information

This course replaces NGEA02 Physical geography, Ecosystem modelling, 15 credits and cannot be included in degree together with this course. Knowledge in ecology and how ecosystems function is recommended since it facilitates assimilation of the course content but is not a requirement.

The course is given at the Department of Physical Geography and Ecosystem Science at Lund University.

Subcourses in NGEN42, Physical Geography: Ecosystem Modeling

Applies from V24

2401 Written exam, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction
2402 Assignments, 3,0 hp
Grading scale: Fail, Pass, Pass with distinction
2403 Project work, 4,5 hp
Grading scale: Fail, Pass, Pass with distinction