BIOS13, Biology: Modelling Biological Systems, 7.5 credits

Biologi: Modellering av biologiska system, 7,5 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2016-02-24 to be valid from 2016-07-01, autumn semester 2016.

General Information

The course is an optional course for a degree of Master of Science in Biology and Molecular Biology and a compulsory course for a degree of Master in Bioinformatics. The course is also given as a single subject course.

Language of instruction: English

Main field of studies	Depth of study relative to the degree requirements
Biology	A1F, Second cycle, has second-cycle course/s as entry requirements
Bioinformatics	A1F, Second cycle, has second-cycle course/s as entry requirements
Molecular Biology	A1F, Second cycle, has second-cycle course/s as entry requirements

Learning outcomes

The general aim of the course is that the students should be able to handle and analyse biological problems that are dependent on mathematical techniques for their solution.

Knowledge and understanding
On completion of the course the student shall be able to:

- in general terms account for the interpretation, applications and limitations of models

- describe mathematical and numerical methods that are used to analyse simple models
- describe how neural networks and genetic algorithms are used in modelling

Competence and skills
On completion of the course the student shall be able to:

- solve mathematical problems within basic algebra and analysis
- carry out basic programming in R
- model a biological system based on a given problem or question
- use mathematical and numerical methods to analyse simple dynamic, static or probabilistic models, such as stability analysis, optimisation or risk analysis

Judgement and approach
On completion of the course the student shall be able to:

- evaluate advantages and disadvantages of different modelling methods for biological systems

Course content

The course starts with an introduction in scientific theory, basic mathematics and programming. Thereafter, applied mathematical methods in biology, with examples from different subject areas such as biochemistry, ecology and physiology, are addressed. The course also contains analytical methods for biological systems.

Course design

The teaching consists of lectures, exercises, seminars and projects. Participation in exercises, seminars and projects are compulsory.

Assessment

The examination takes place partly through a written examination, partly through compulsory parts. For students who have not passed the regular examination, an additional examination in close connection to this is offered.

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.
To pass the entire course, approved examination and approved compulsory parts are required. The final grade is decided through weighing of the results of the parts that are included in the examination.

Entry requirements

For admission to the course, a degree of at least 180 credits is required and at least 15 credits at second-cycle level within Biology, Molecular Biology or Bioinformatics. At least 7.5 credits statistics or programming are required. English 6/B.

Further information

The course may not be included in a degree together with BIOS02 Methods in Modelling Biological Systems 7.5 credits.

Subcourses in BIOS13, Biology: Modelling Biological Systems

Applies from H16

1601   Modelling Biological Systems, 7,5 hp
        Grading scale: Fail, Pass, Pass with distinction