Models in System Biology

Programme course

2 credits

Systembiologisk modellering

TBMT37

Valid from: 2020 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2019-09-23
Main field of study

Biotechnology

Course level

First cycle

Advancement level

G2X

Course offered for

- Chemical Biology, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Basics courses in Chemistry, Biology and Mathematics

Intended learning outcomes

This course will provide experience in mathematical modeling of biological systems. After completing this course, the participant shall be able to:

- explain why mathematical modeling is a tool in biological experimentation; explain some of the common mistakes
- construct a mathematical model of a class of biological systems
- analyzing, structuring and simulating mathematical models based on differential equations
- use methods for structured modeling in systems biology
- adapt mathematical models to measured data
- validate mathematical models to measured data; basic statistical tests
use modern computerized tools for mathematical modeling in systems biology
apply and integrate this with knowledge from previous courses

Course content

Lectures, laboratory work covers:

- Systems biology: what it is, methods, issues and opportunities.
- Mathematical modeling. Types of models and their properties.
- Software for mathematical modeling and simulation in systems biology.
- System Identification: adaptation of mathematical models to experimental data.
- Validation and use of mathematical models. Troubleshooting and uncertainty analysis

Teaching and working methods

The course consists of lectures and a large laboratory assignment and voluntary pre-assignments. The course is examined by two minor tests together with oral discussions of the laboratory work.
The course runs for the first three weeks during the spring semester.

Examination

UPG1 Tests U, G 2 credits
Grades are given as ’Fail’ or ’Pass’.

Grades

Two grade scale, older version, U, G

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is Swedish, the course as a whole or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the
course could be given in English. Examination language is Swedish.

- If teaching language is Swedish/English, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English (depending on teaching language).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

Department

Institutionen för medicinsk teknik

Director of Studies or equivalent

Marcus Larsson

Examiner

Elin Nyman

Education components

Preliminary scheduled hours: 18 h
Recommended self-study hours: 35 h

Course literature

Websites

Gunnar’s Crash Course in Systems Biology. Online-lectures.

Compendiums