Models in System Biology

Programme course

2 credits
Systembiologisk modellering
TBMT19
Valid from: 2019 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2018-08-31
Main field of study
Biotechnology

Course level
First cycle

Advancement level
G2X

Course offered for
- Engineering 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

F, P

Subject area

Biotechnology

Disciplinary domain

Technology
Department

Department of Biomedical Engineering (IMT)

Director of Studies or equivalent

Marcus Larsson

Examiner

Gunnar Cedersund

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