Models in System Biology

Programme course

2 credits

Systembiologisk modellering

TBMT19

Valid from: 2017 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2017-01-25

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	2 credits	U, G

Grades are given as 'Fail' or *Pass'.

Grades

Two-grade scale, U, G

Department

Institutionen för medicinsk teknik

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

Additional literature

Websites

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

Compendia

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.