DD2398 Quantitative Systems Biology 7.5 credits

Kvantitativ systembiologi

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for DD2398 valid from Spring 2009

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Biotechnology,Computer Science and Engineering

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the student should be able to

* formulate mathematical models of gene regulatory networks on the level of kinetic equations

* simulate such systems and compare to experimental data

* discuss network properties in genomic data

* compute simple graph theoretical properties of such data

so that they will be able to

* independently construct computer programs that model melecular mechanisms of gene regulation

* in professional life identify biological problems that a sufficiently well describe that mathematical modeling and simulation could be of added value

Course contents

The basic circuitry in transcription regulation, and other biological networks, including examples. The principle of robustness in biological systems of control.Kinetic proofreading and other error-correcting mechanisms in biological information-processing. Principles of kinetic equations in gene regulatory modelling. Motifs in biological and other networks.

Course literature

Uri Alon, 2007
An Introduction to Systems Biology: Design Principles of Biological Circuits
Chapman & Hall/CRC Mathematical and Computational Biology Series
ISBN-10: 1-58488-642-0
ISBN-13: 978-158488-642-6

Examination

- LAB1 - Laboratory Work, 2.5 credits, grading scale: P, F
- TEN1 - Examination, 5.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Students will have one opportunity to correct every iuncorrectly executed homework assignment until the individual examination on the course start, no longer however than until three weeks after the last lecture in the course. Other possibilities and modalities to be examined on the course to be discussed with the examiner in each case.

Other requirements for final grade

Four homework assignments give one grade point per
correctly executed assignments. For the highest grade, four correctly executed assignments and an individual examination are required.

The individual examination is conducted by the examiner with one assistant under at least 30 minutes and at most 60 minutes per student.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.