

COURSE DETAIL

COMPUTATIONAL SCIENCE: SYSTEMS BIOLOGY - MODELS AND COMPUTATIONS

Country

Sweden

Host Institution

Lund University

Program(s)

Lund University

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Mathematics Computer Science Biological Sciences

UCEAP Course Number

116

UCEAP Course Suffix**UCEAP Official Title**

COMPUTATIONAL SCIENCE: SYSTEMS BIOLOGY - MODELS AND COMPUTATIONS

UCEAP Transcript Title

SYST BIO MODELS CMP

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

The course covers the translation between biology and mathematics; population models and spatial models, simulations: Deterministic versus stochastic simulations of mathematical models; weaknesses, strengths, and applicability; the Gillespie algorithm for stochastic simulations: Naive implementation and possible optimizations for large systems; cost functions; optimization methods including local optimization, thermodynamic methods, particle-swarm optimization, and genetic algorithms; and sensitivity analysis: Estimation of the uncertainty of determined parameter values. Strategies to achieve robustness. Admission to the course requires 90 credits Science studies, including knowledge equivalent to BERN01 Modelling in Computational Science, 7.5 credits or FYTN03 Computational physics, 7.5 credits and English 6/B. Admission to the course also requires knowledge in programming in Python equivalent to NUMA01, 7.5 credits or similar knowledge in Matlab, C++ or the like programming language.

Language(s) of Instruction

English

Host Institution Course Number

BERN06

Host Institution Course Title

COMPUTATIONAL SCIENCE: SYSTEMS BIOLOGY - MODELS AND COMPUTATIONS

Host Institution Course Details

<https://kursplaner.lu.se/pdf/kurs/en/BERN06>

Host Institution Campus

Lund

Host Institution Faculty

Science

Host Institution Degree

Host Institution Department

Course Last Reviewed

2024-2025

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