# 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 Campus**
Lund

**Host Institution Faculty**
Science

**Host Institution Degree**

**Host Institution Department**

Print