Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

2FY812 Datorfysik I, 7,5 högskolepoäng
Computational Physics I, 7.5 credits

Main field of study
Physics

Subject Group
Physics

Level of classification
First Level

Progression
G2F

Date of Ratification
Approved by the Board of the School of Computer Science, Physics and Mathematics 2010-11-26

The course syllabus is valid from autumn semester 2011

Prerequisites
Physics 45 credits, and Mathematics 45 credits or equivalent.

Expected learning outcomes

- Knowledge of computer simulation and methods for different physical and technical applications.
- Understanding and ability to write algorithms and simple computer programs to perform simulations.
- Knowledge and ability to use simple standard programs for computations and simulations.

Content

Basic skills in using standard mathematics programs such as Mathematica and/or Matlab.

Numerical integration of differential equations. Applications on mechanical systems including chaotic and many-body problems.

Finite difference method: Poisson equation, diffusion equation. Applications on electrostatic problems, diffusion and heat conduction.

Monte Carlo methods, random numbers and statistical distributions. Applications on

thermodynamic systems and the Ising model.

Curve fitting and basic regression analysis.

Type of Instruction

Lectures, laboratory exercises and/or project work.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).
On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

Assessment of student performance is made through written test and/or oral examination and/or presentation of mandatory assignments.
The assessment method is decided at the start of the course.
Students who do not pass the regular examination are given the opportunity to do a resit examination shortly after the regular examination.

Course Evaluation

A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Required Reading and Additional Study Material

Required Reading

Harvey Gould, Jan Tobochnik, and Wolfgang Christian: *An Introduction to Computer Simulation Methods: Applications to Physical Systems"*