14/07/2019

Introduction to Computational Physics
86-362-01

Lecturer: Dr. Ronny Bartsch
Course type: Lecture and practice
Date: 2019-2020 **semester:** B **weekly hours:** 2

A. Aim of course:

The Introduction to Computational Physics course includes an overview over historic milestones in the field as well as recent research developments. Students learn how to solve specific physics problems with the computer.

B. Details of subjects to be covered:

- Concepts of computational physics
- Fractals, chaos, percolation and complex networks
- Fourier Transform, Wavelet Transform, Hilbert Transform
- Time series analysis, bivariate coupling analysis, phase synchronization analysis
- Random number generation
- Monte Carlo simulations

Class activities: Teaching, writing on board, discussion with students and presentation of computer simulations.

C. Course mandatories:

Introduction to computers/programming course.

D. Grading:

100% homework assignments and/or final presentation/project.

E. Bibliography:

Numerical Recipes: The Art of Scientific Computing-Third Edition (2007), 1256 pp. Cambridge University Press.