

Computer Physics

Introductory information (full info → Syllabus)

- **lectures:** 5 x 3 h = 15 hours
- **computer labs:** 10 x 3h = 30 hours

- **lecturer & lab stuff:**

Dr Hab. Eng. Tomasz Chwiej

email: chwiej@fis.agh.edu.pl

phone: 617-44-71 (44-71 internal university phone number)

personal contact: room 318, building D7, 3 floor

- **office hours:** 12:00-13:00, monday, room 318, buiding D7

kind request concerning the office hours

If You would like to meet me at different time, let me know sending me an email with proposition of time and date of meeting convinient for You (but before see my schedule at Unitime)

- **webpage**

http://galaxy.agh.edu.pl/~chwiej/comp_phys.html

Lectures:

- attendance not required but kindly requested
- no exam/coloquia, the final grade comes from the partial grades achieved at computer labs

Computer labs:

- students are obliged to attendance the labs
- during the labs students make short numerical project, but

activity during the labs is not assessed

- preferred programming language: C/C++
- each project is accomplished with

report prepared at home which is assessed,

the reports in electronic form (pdf-format) should be sent to instructor
(the link + other instructions will be given at first computer lab → UPEL platform)

During the course there will be presented the numerical methods used to solve stationary and dynamical problems of classical mechanics.

Numerical projects conducted at computer labs will follow closely the content presented at lectures
- heavy stress is put on „practising numerical methods” to improve the students’ computational programming skills and competences.

Outline of the course

- Solving Ordinary Differential Equations (initial value problems)
- Molecular Dynamics (gas $\leftrightarrow$ liquid $\leftrightarrow$ solid)
- simulations of other classical many-body dynamics

- **Bibliography:**

Springer search/download link : <https://link.springer.com>

- Franz J. Vesely „**Computational Physics – an introduction**”, Springer
- Philip Scherer „**Computational Physics – Simulation of classical and quantum systems**”, Springer
- Benjamin Stickler, Ewald Schachinger „**Basic Concepts in Computational Physics**”, Springer
- Michael Griebel, Stephan Knappek, Gerhard Zumbush „**Numerical simulation in molecular dynamics**”, Springer
- Konstantinos Anagnostopoulos „**Computational Physics**”,
free download from author’s web page:
<https://www.physics.ntua.gr/~konstant/ComputationalPhysics/download.html>
- J.M. Thijssen „**Computational Physics**”, Cambridge
- Joseph Boudreau, Eric Swanson „**Applied computational physics**”, Oxford
- D.C. Rapaport „**The art of molecular dynamics simulations**”, Cambridge
- Michael Allen, Dominic Tildesley „**Computer simulation of liquids**”, Oxford