האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Introduction to Computational Physics - 77315

Last update 10-04-2024

HU Credits: *4*

Degree/Cycle: *1st degree (Bachelor)*

Responsible Department: *Physics*

Academic year: *0*

Semester: *2nd Semester*

Teaching Languages: *Hebrew*

Campus: *E. Safra*

Course/Module Coordinator: *Dr. Shimon Asida*

Coordinator Email: *sasida@phys.huji.ac.il*

Coordinator Office Hours: *sunday 15:00*

Teaching Staff:

Dr. Shimon Asida

Course/Module description:

An introductory course to Computational Physics. Includes Mathematical background, algorithms and major Physical applications. Exercises using Python.

Course/Module aims:

Basic knowledge and experience in Computational Physics.

Learning outcomes - On successful completion of this module, students should be able to:

Examine physical problem and various methods for computational solution.
To implement different algorithms for solving physical problems.
Consider various properties of numerical solution such as accuracy, stability and efficiency.
Check correctness of computed solution.
Examine feasibility of various options of parallel computation for solving physical problem.

Attendance requirements(%):

0

Teaching arrangement and method of instruction: lecture notes for self learning
lectures
exercises

Course/Module Content:

round off errors, accuracy and stability
numerical differentiation
interpolation
numerical integration of functions
root finding in one dimension
solution of a set of linear equations
Eigen vectors and Eigen values
root finding in multi dimensions
minimum finding
Ordinary Differential Equations
Partial Differential Equations

initial value problems
diffusion equation
advection equation
Hydrodynamics
Monte-Carlo methods
introduction to parallel computing

Required Reading:
None

Additional Reading Material:
None

Grading Scheme:
Essay / Project / Final Assignment / Home Exam / Referat 25 %
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 75 %

Additional information:
None