



TEL AVIV אוניברסיטת
UNIVERSITY תל אביב

Full Syllabus



Course Title

Computers for Physics

Lecturer

Prof. Roy Beck-Barkai. TAs: Yamin Ben Shimon, Meshy Ochana

Semester

A

Course requirements

Final grade components

Mid-term exam: 4 Dec 2026. Final exam: Moed A, 20 Jan 2027; Moed B, 18 Apr 2027.

Course schedule

Class no. / Date	Subject and Requirements (assignments, reading materials, tasks, etc.)
1 / 18 Oct 2026	Opening lecture; Tutorial 1: Data Types and Conditionals. Introduction to hardware, software, and Python; variables and naming; numeric, Boolean, and string data types; type conversion.
2 / 25 Oct 2026	Tutorial 2: Conditionals and Functions. if, elif, and else statements; nested conditions and logical operators; built-in and user-defined functions, parameters, arguments, and return values.
3 / 1 Nov 2026	Tutorial 3: Lists. Creating and modifying lists; indices and operators; list functions and methods; slicing, sorting, nested lists, and practical examples.
4 / 8 Nov 2026	Tutorial 4: Loops and Control Flow. for and while loops; range; stopping conditions; break and continue; nested loops and list comprehensions.
5 / 15 Nov 2026	Tutorial 5: Memory and Advanced Functions. Mutable and immutable objects; references and copies in memory; variable behavior inside functions; advanced uses of functions.
6 / 22 Nov 2026	Tutorial 6: Data Structures. Tuples and dictionaries; differences from lists; string formatting; reading data from files and writing results to files.
7 / 29 Nov 2026	Tutorial 7: NumPy. Vectorization and array creation; shape, ndim, size, and dtype; indexing and slicing; views versus copies; sorting, arithmetic operations, Boolean masks, and physical constants; translating physical formulas into code. Midterm exam: 4 Dec 2026.
8 / 6 Dec 2026	Tutorial 8: Matplotlib. scatter and plot; figures and axes; labels, units, and legends; multiple curves and subplots; logarithmic scales, histograms, error bars, and saving plots.
9 / 13 Dec 2026	Tutorial 9: Advanced NumPy and Integration. Multidimensional arrays and axes; reshape, transpose, stack, concatenate, broadcasting, meshgrid, axis reductions, diff, cumsum, trapezoid, and quad.



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10 / 20 Dec 2026	Tutorial 10: pandas. Tables versus arrays; DataFrame and Series; loading CSV files; selecting, filtering, sorting, groupby, describe, and conversion to NumPy using <code>to_numpy</code> .
11 / 27 Dec 2026	Tutorial 11: Statistics and Curve Fitting. Data cleaning and outliers; mean, standard deviation, and SEM; noise and error propagation; linear and weighted fitting; residuals, coefficient uncertainties, chi-squared, R-squared, and model comparison.
12 / 3 Jan 2027	Tutorial 12: Version Control with Git. Creating a repository and saving versions with <code>init</code> , <code>add</code> , and <code>commit</code> ; <code>log</code> , <code>diff</code> , <code>status</code> , <code>.gitignore</code> , GitHub, <code>clone</code> , <code>push</code> , <code>pull</code> , collaboration, branches, and merging.
13 / 10 Jan 2027	Extended Tutorial. Further exploration of selected course topics, comprehensive exercises and exam preparation.
Required course reading	
https://tauinnov.github.io/CFS/intro.html	
Optional course reading	
Comments	