



11110PHYS401300  
Computational Pphysics Lab  
計算物理實作

## Syllabus

### Instructor

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### Teaching assistant (TA)

TBA

### Class schedule

Lectures on Monday from 13:20 - 16:20  
General building II, R521

### Preface

The goal of this course is to let undergraduate students know how to solve common physical problems numerically. Students will learn basic numerical algorithms through a few Lab projects in the course. Basic knowledge of classical mechanics, quantum physics, electrodynamics, and thermal physics are required. Previous experience with Python or other computing languages is preferred. A Unix-like system (e.g. Linux, Mac OS X, or Windows 10 subsystem for Linux) is required. Students are encouraged to bring a laptop to class.

### Tentative topics

#### Topics

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- 1 Command Line Interface / Editors / Shell / Version control
  - 2 Basic programming with Python
  - 3 Data Visualization
  - 4 Lab 1: Simple Harmonic Oscillator (damped systems / forced oscillations)
  - 5 Lab 2: N-body systems (Stars / Molecular dynamics)
  - 6 Lab 3: Schrödinger equation (Wave function / Hydrogen atom)
  - 7 Lab 4: Gas dynamics (Explosions / Shock / Turbulence)