Applications in Computational Physics Syllabus

Physics 365

Course description

A project-driven laboratory experience in Computational Physics at an advanced level. Includes the use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include classical mechanics and electromagnetism.

Credits

This laboratory course meets 3 hours per week for a total of 30 hours—with no assignments outside class—for 1 credit.

Prerequisite and Corequisite

Physics 213 is a prerequisite. Students should take Physics 265 prior to Physics 365, or talk with the instructor about whether they have adequate preparation. We encourage students to take this course alongside Physics 320, Physics 421 and Physics 422, which cover the same physical systems.

Outline of course content

- Review of python and introduction to numpy and matplotlib
- Electrostatics
- Finite-angle pendulum

Measurable student learning outcomes

Students will be able to

- Write functions and complete programs in python.
- Apply the python programming language to solve scientific problems.
- Be familiar with the matplotlib and numpy packages.
- Understand the physical systems studied in the course.
Evaluation of student performance

- 50% class attendance
- 50% class participation, which will be evaluated on the basis of problems solved in a group context, taking account of individual contributions.

Learning resources

There is no required textbook. Course notes will be available on the course website. Students are also encouraged to make use of the numerous python tutorials and programming resources available on the web.

Statement regarding students with disabilities

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Expectations for student conduct

Students are expected to comply with the university policies on student conduct (see http://oregonstate.edu/studentconduct/code/index.php).