
Math 793: Scientific Computational Lab

Scientific Programming with Python

Spring 2017

Department of Mathematical Sciences, UWM

Lecture Time and Place

4:30 PM to 6:10 PM, Wednesday (two-credit course), 1/23/2017 to 5/11/2017,
EMS Room E423

Instructor

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Office Hours: 10:30 PM - 11:30 PM, Monday and Wednesday.

Textbook

A Primer on Scientific Programming with Python, by H. P. Langtangen, Springer, 5th
edition, 2016.

Course Overview

This course teaches basic scientific programming in the Python programming language. Python is easy to learn and particularly suited for teaching and learning scientific programming. It is also quite similar to MATLAB so that students who know MATLAB programming can have advantage to learn the Python programming.

In class, the examples from mathematics, physics, biology, and finance will be used to teach Python programming, including figure plotting, which students often need for their theses and research papers.

The author of the textbook has developed a web page, <https://hplgit.github.io/scipro-primer/>, to provide students with all the example programs from the book as well as information on installation of the required software packages Numpy and Matplotlib on various platforms.

We have combined Python with advanced programming languages Fortran, C, and C++ to develop several software packages. One of them has been published on the web server SMPBS <http://smpbs.math.uwm.edu>. The related paper can be downloaded from the Journal of Computational Chemistry on the URL: <http://onlinelibrary.wiley.com/doi/10.1002/jcc.24703/full>. This software will be introduced in this course as a good example of the Python programming for solving partial differential equations based on a state of art finite element library from the FEniCS project <https://fenicsproject.org>.

Prerequisite

Calculus, linear algebra, and differential equations.

Grading

The grade will be based on the class attendance (10 %), homework (50 %), and one course project (40 %).

Attendance:

Attendance at the lectures is required. Two-points reduction will be taken for each class missing. The maximum of class missing reduction points is 10. There is no provision for absences due to vacations, family outings and other social activities, other special plans and appointments, etc. Absence due to illness requires a medical excuse on Physician's letterhead, signed by the physician.

Important Dates

- January 25: First day of classes.
- February 17: Last day to drop without a "W" on record.
- March 17: Last day to drop.
- March 19 to 26: Spring Recess.
- May 10: Last day of classes.
- May 17: Presentation of the course project (4:30 PM - 6:30 PM).

Statement of Academic Misconduct

The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Further

information can be found at

http://www.uwm.edu/Dept/Acad_Aff/policy/academicmisconduct.html.

Statement of Sexual Harassment

Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the careers, educational experience, and well being of students, faculty and staff. The University will not tolerate behavior between or among members of the University community which creates an unacceptable working environment.