

# *Mathematical Programming in Python*

Math 1800: Special Topics

Spring 2023 Semester

Student Guidelines and Syllabus

[https://people.sc.fsu.edu/~jburkardt/classes/math1800\\_2023/syllabus/syllabus.pdf](https://people.sc.fsu.edu/~jburkardt/classes/math1800_2023/syllabus/syllabus.pdf)

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**Description:** This course will teach you a computational approach to define, program, and solve a variety of basic mathematical problems, and to create reports and plots of the results. You will write and run many programs on your personal laptop. The mathematical topics and the necessary computational skills will be presented at an introductory level. The class is aimed for undergraduate and graduate students in mathematics; students from other scientific disciplines should also be able to handle all the material. For lectures and coursework, the Python programming language will be introduced. To accommodate the wide range of student backgrounds, the weekly assignments will include ten problems, and you will be allowed to select three to work on.

**Mathematical Topics:** Topics to be covered will be selected from the following:

- The Collatz Conjecture
- Combinatorics
- Data Analysis
- Differential Equations
- Gradient Descent
- Graph Theory
- Graphics
- Grids
- Iteration
- Linear Algebra
- Numerical Mathematics
- Polynomials
- Prime numbers
- Probability
- Quadrature
- Simulation
- Symbolic Mathematics
- Triangles
- Triangulations

**Prerequisite:** You should have taken Math 0220 (Calculus I) and one of Math 0280 (Introduction to Matrices and Linear Algebra), MATH 1180 (Linear Algebra I), or MATH 1185 (Honors Linear Algebra), with a grade of C or better. No prior knowledge of Python is required, and the mathematical topics will be explained as presented.

**Grading:** There will be no exams. Each week, corresponding to the new material on Python and mathematics, there will be a set of ten computational exercises. You will choose three of these exercises to work on. You will be graded on the quality of your correct understanding, careful implementation, and concise presentation of results.

**Text:** Christian Hill, *Learning Scientific Programming with Python*, Cambridge University Press, Second Edition, 2020, ISBN: 978-1108745918.

You may also find a useful introduction by working through the initial part of the *Python Tutorial* at

<https://docs.python.org/3/tutorial/>

**Access to Python:** You can install Python on their laptop, available at

<https://www.anaconda.com/products.individual>

or work online, using your browser to access Google Colab at:

<https://colab.research.google.com/>

**Getting Help:** The Pitt IT Help Desk may be able to assist you if you have trouble installing Anaconda on your laptop. Send email to

[helpdesk@pitt.edu](mailto:helpdesk@pitt.edu)

or check their web page at

<https://www.technology.pitt.edu/247-it-help-desk>

**Office Hours:** Office hours will be 10:00 to 10:50pm, Monday and Wednesday. My office is room 618, Thackeray Hall. My university email is [jvb25@pitt.edu](mailto:jvb25@pitt.edu).

**Disability Resource Services:** If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union (412) 624-7890 as early as possible in the term.

**Academic Integrity:** Cheating and plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity will incur a minimum sanction of a zero score for the work in question. Additional sanctions may be imposed, depending on the severity of the infraction.