

EML4930/EML6934 — Python Programming — Fall 2017

1 Credit — Thursday 10:40 - 11:30 — Room: MAE-A 303

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Office hours: Tuesday 9:00 - 11:00 or by appointment (MAE-A 224)

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1 Course description

Python is a general purpose programming language. Course covers the basics, linear algebra, plotting, and more to prepare students for solving numerical problems with Python. Python is a viable **free** and **open** alternative to MATLAB. Prerequisite: COP 2271 MATLAB or equivalent.

2 Course prerequisites

Students should have taken some type of intro to programming course before (COP 2271 MATLAB or equivalent).

3 Required resources

Computer and internet connection.

4 Grading policy

No late homework. Two homeworks dropped. A homework will be assigned at the end of every lecture related to the topic of the lecture.

- 12 out of 14 homework — 60 % of final grade
- 2 quizzes — 10 % of final grade
- 1 final exam — 30 % of final grade

%	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0.00 - 59.9	E	0.00

5 Tentative outline

0. 08/24 About Python (2 vs 3), IDEs, IPython¹, notebooks, and installation
1. 08/31 Basics: data types, math, loops
2. 09/07 Functions, classes, objects, namespace
3. 09/14 Python libraries and pip
4. 09/21 Numpy² and Matrix operations
5. 09/28 More Numpy² and Matplotlib³ for 2D plots (**First quiz 15 mins before end of class**)
6. 10/05 Contour plots, 3D plot, Histograms
7. 10/12 Statistical distributions and functions
8. 10/19 Optimization in Scipy⁴
9. 10/26 Python read and write: opening and modifying text/csv files
10. 11/02 Symbolic math with SymPy⁵, DOE with pyDOE (**Second quiz 15 mins before end of class**)
11. 11/09 Scikit-learn⁶ surrogate modeling
12. 11/16 Scikit-learn⁶: surrogate modeling and machine learning
13. 11/30 Pandas⁷ and DataFrames / Review for final
14. 12/11 Final Exam (same time same room)

6 UF policy

UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:

Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

COURSE EVALUATION Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific

¹IPython provides a rich architecture for interactive computing with Python. <https://ipython.org/>

²NumPy is the fundamental package for scientific computing with Python. <http://www.numpy.org/>

³Matplotlib is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. <https://matplotlib.org/>

⁴SciPy is a Python-based ecosystem of open-source software for mathematics, science, and engineering. <https://www.scipy.org/>

⁵SymPy is a Python library for symbolic mathematics. <http://www.sympy.org>

⁶Machine Learning in Python. <http://scikit-learn.org>

⁷*pandas* is an open source, BSD-licensed library providing high-performance, easy-to-use data structures and data analysis tools for the Python programming language. <http://pandas.pydata.org/>

times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

STUDENT PRIVACY There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

7 Campus resources

U Matter, We Care: Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS) Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

8 Additional resources

For those that would like a textbook to follow, I'd recommend Dr. Jake VanderPlas's *Python Data Science Handbook: Essential Tools for Working with Data*. <http://shop.oreilly.com/product/0636920034919.do>. Dr. VanderPlas has made the textbook available for free in the form of Jupyter notebooks which can be viewed at <https://github.com/jakevdp/PythonDataScienceHandbook> or <http://nbviewer.jupyter.org/github/jakevdp/PythonDataScienceHandbook/blob/master/notebooks/Index.ipynb>

A whirlwind Tour of Python by Dr. VanderPlas is a short book to prepare users with the bare essentials for working with Python. It is also available for free at <http://www.oreilly.com/programming/free/files/a-whirlwind-tour-of-python.pdf> or <https://github.com/jakevdp/WhirlwindTourOfPython>

Important links:

- Python main website <https://Python.org>
- Anaconda download <https://www.continuum.io/downloads>
- Enthought Canopy download <https://store.enthought.com/downloads/>
- Write Python 2.7 and 3.X code <http://python-future.org/imports.html>

If you are coming from MATLAB:

- <http://mathesaurus.sourceforge.net/matlab-numpy.html>
- <https://docs.scipy.org/doc/numpy-dev/user/numpy-for-matlab-users.html>