

Computing for Non-majors: A DeCal

About this class

Computing for Non-majors attempts to address the growing need for computing skill by teaching programming and basic computer knowledge to students who have no prior experience with such things. It is intended for just about anyone except Computer Science majors. Because we are targeting complete beginners, we won't be able to cover as much as some other classes do, but we hope to give you enough background that you can accomplish common programming tasks and learn how to develop more skills on your own!

What we will learn

The core of the class is programming in Python. We will cover programming topics such as control flow, types, functions, objects, basic data structures, and efficiency of algorithms. There will be a strong emphasis on “learning how to learn” – we will talk about how to find and use third-party libraries, read and write documentation, and locate useful information online. We will demonstrate how to use libraries to parse text data, make plots, download data from the web (?), and read databases. Once everyone has a working understanding of programming, we will have electives where students can choose topics that relate to their interests. Everything will come together at the end with an open-ended project.

Grading

Since this is a DeCal, we'll of course be focusing on learning rather than grading. But grades are helpful for you to receive feedback, and also we are required to do them. So here's the point breakdown:

- Homework – 30%
- Structured Project I – 20%
- Structured Project II – 20%
- Open-ended Project – 30%

Schedule

- Week 1** – Introduction to the class; overview/demonstration of programming
- Week 2** – Getting the programming environment set up; basic UNIX CLI
- Week 3** – Control flow
- Week 4** – Functions
- Week 5** – Types
- Week 6** – Objects
- Week 7** – Data structures
- Week 8** – Efficiency of algorithms
- Week 9** – Parsing text
- Week 10** – Data visualization
- Week 11** – Fetching data from the internet (?)
- Week 12** – Interacting with databases
- Week 13** – Electives
- Week 14** – Electives
- Week 15** – Project showcase

Possible Electives

- Git** – a popular version control system used to manage projects (especially those that have many contributors)
- Game development** – learn how to develop simple games (Pygame (?))
- MATLAB** – an environment for scientific and engineering computations
- Web development** – learn how to make simple websites (HTML, CSS, JavaScript, jQuery)
- Data analysis** – analyze datasets to extract useful information and make predictions (NumPy, Pandas, scikit-learn)
- L^AT_EX** – a typesetting system to make beautiful documents (like this one!), especially involving mathematical formulas

Alternatives

If you're not sure that *Computing for Non-majors* is the right class for you, consider the alternatives:

CS 61A – The Computer Science department's introductory class for (EE)CS majors, taught in Python (and some Scheme and SQL). Recommends prior programming experience, although some brave souls without experience attempt it anyways. This is a challenging class, but it will teach you a lot!

CS 61AS – The self-paced version of CS 61A, taught in Scheme. It is nice to be able to go at your own pace, but you'll have to be self-motivated to keep up. This can be taken for a variable number of units if you want to spread it over two semesters or pack extra stuff into one semester.

CS 10 – The CS department's for-beginners class. Uses a graphical programming environment to teach the logical thinking behind programming, then dives into some textual programming at the end.

Stat 94 – A new class about data science. It appears to teach some programming with a strong statistical emphasis. Recommended for students whose primary use for coding is to analyze data.

Practical Programming Skills – A DeCal that teaches real-world coding skills to students who have already done some programming. If you have programming experience, this would be the class for you.

Introduction to Scientific Computing with Python – A DeCal about programming, with applications in physics and astronomy. Also does a little bit of L^AT_EX and HTML.

Web Design DeCal – A DeCal about creating websites.

Rails DeCal – A DeCal about Ruby on Rails, a popular web framework.