

USC VITERBI SCHOOL OF ENGINEERING INFORMATICS PROGRAM

INF 510: Principles of Programming for Informatics

Dr. Jeremy Abramson

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When emailing: Put "INF510" in the subject line

Teaching assistant: Olutobi Akomolede

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LECTURE

Time: 3:30-5:20 PM

Days: Tuesday

Room: KAP 158

LAB

Time: 3:30-5:20 PM

Days: Thursday

Room: KAP 145

Instructor's office hours: TBD/By appointment (Probably just before class in GER 207)

Students are advised to make appointments with the professor ahead of time in any event and be specific with the subject matter to be discussed. Students should also be prepared for their appointment by bringing all applicable materials and information.

Teaching Assistant: Olutobi Akomolede

Textbook (on the web)

[Exploring Data In Python 3](#), plus other materials

Catalogue Description:

Introductory programming course for non-Computer Science majors. Programming in Python for retrieving, searching, and analyzing data from the Web. Learning to manipulate large data sets. (Note: The USC Catalogue description on the web contains an error – Java will **not** be taught or used in this course.)

Expanded Course Description:

This course is designed to serve as an introduction to computer science concepts and basic programming skills that are specifically geared toward Informatics, and forms a part of the introductory coursework for the program in Communication Informatics. The main objective of this course is to introduce the fundamental

concepts behind general computer science and programming, and to give students practical hands-on experience reading and writing computer programs, in order to give them the tools to manipulate large data sets.

The course is designed to be accessible to non-Computer Science major students with little or no programming experience, and emphasizes writing programs that are capable of retrieving and manipulating large amount of data. The first half of the course focuses on Python as a first programming language, while the second half of the course covers selected advanced topics such as data visualization, web scraping, database access and others.

The course will be a combination of lecture, in-class discussion, readings, written homework assignments, a mid-term exam, and a final exam.

Course Objectives:

The objective of this course is to train students to be able to read and write computer code capable of manipulating large data sets. Specifically, students successfully completing this course will achieve three main objectives:

1. Develop sufficient proficiency in Python to write application capable of retrieving, searching, manipulating, and analyzing data
2. Acquire basic concepts in computer science and programming.

Methods of Teaching:

The primary teaching methods will be discussion, case studies, and lectures. Students are expected to perform directed self-learning outside of class which encompasses, among other things, a considerable amount of programming practice. There will a midterm exam and comprehensive final exam.

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Students are expected to have access to a computer that can run the Python programming language and a web browser, and to bring it to class. If this is a problem, please contact the instructor. Beyond that, no special computing facility, hardware or software will be necessary for this course.

Grading Scheme:

Homework Assignments: 15%

Labs: 15%

Mid-Term: 20%

In Class Final Exam: 20%

Final "Project": 25%

Participation: 5%

Total 100%

Grades will range from A through F. The following is the breakdown for grading:

94 - 100 = A 74 - 76 = C

90 - 93 = A- 70 - 73 = C-

87 - 89 = B+ 67 - 69 = D+

84 - 86 = B 64 - 66 = D

80 - 83 = B- 60 - 63 = D-

77 - 79 = C+ Below 60 is an F

The graded coursework will consist of six major components:

1. CLASS PARTICIPATION - Students are expected to arrive in class each day having completed the reading assignments for the period, and to be prepared to engage in informed discussion about those materials.
2. HOMEWORK - There will be a number of assignments given throughout the semester. Assignments can include a set of exercises from the textbook and may include additional questions from outside sources. Each student is expected to submit the completed assignment each week. All homework assignments are to be submitted individually and students will receive individual scores. Guidelines and additional information will be developed to provide a common vernacular for the assignments. It is crucial that students turn in whatever they have completed on the due date. NO assignment will be accepted late. An incomplete grade will be granted only under the conditions called out in the student handbook, *SCAMPUS*, which is available online, <http://scampus.usc.edu>.
3. LABS: There will be laboratory assignments given [roughly] every week. These assignments reinforce the content discussed in lecture. They are to be completed individually, during the lab session. Unless explicitly stated otherwise, late submissions are not permitted.
4. MID-TERM EXAM - A written exam, halfway through the term, covering material taught up to that point.

5. FINAL "PROJECT": A large final project that builds on the techniques taught in class. The final project will be a programming assignment that will address a number of data acquisition, modeling, processing and analysis techniques that were taught throughout the semester.

6. FINAL EXAM - A culminating exam, covering all of the material from the course, will be held during the exam period at the end of the semester (date will be posted in the online Schedule of Classes).

Class Communication:

Blackboard at USC and a course webpage will be used for class communication.

Books and Readings:

All books, papers or reports will be available to students in one of three ways: 1) in the USC bookstore; 2) via a CD that the instructor will provide at the beginning of class; and/or 3) via the web.

Required Reading:

Python for Informatics: Exploring Information. Charles Severance. An open textbook, available online. (PI)

Potential other textbooks, videos and resources from the internet

Class Structure & Schedule:

Class sequence, dates, topics and guest speakers are subject to change as the semester proceeds. Any revisions will be noted and announced in class in advance.

| | Topics/Activities | Readings & Homework | Lab |
|-------------------|--|-----------------------------|---------------|
| Wk1 (Aug 21) | Introduction, variables, conditionals, iteration, types | PI Ch. 1 & 2, pg. 1-32. | Lab 1 |
| Wk2 (Aug 28) | Types, type coercion, Boolean/logical expressions, review conditional execution, exceptions, functions | PI Ch. 3 & 4, pg. 33-58 | Lab 2 |
| Wk3 (Sept 4) | Review exceptions, review "is" vs. "==", iteration (while, for, etc.), strings, string operations | PI Ch. 5 & 6, pg. 59-80. | Lab 3 |
| Wk4 (Sept 11) | Review Python tracebacks, review repr vs. print, file I/O, lists, list operations | PI Ch. 7 & 8, pg. 81-110. | Lab 4 |
| Wk5 (Sept 18) | Internal Python data structures: Dictionaries, tuples, sets | PI Ch. 9 & 10, pg. 111-132. | Lab 5 |
| Wk6 (Sept 25) | Python objects, inheritance, operator overloading, creating multiple/dynamic objects | PI Ch. 14 | Lab 6 |
| Wk7 (Oct 2) | *args, **kwargs, dynamic object creation, __main__ and modules, Python review | PI Ch. 1-10, 14 | Lab 7 |
| Wk8 (Oct 9) | Midterm | | Mid-Term Exam |
| Wk9 (Oct 16) | The DOM, the requests library, Web scraping with BeautifulSoup, project introduction | PI Ch. 12 | Lab 8 |
| Wk10 (Oct 23) | XML, JSON, web APIs | PI Ch. 13 | Lab 9 |
| Wk11 (Oct 30) | Intro do DBs, Intro to SQL (simple DB example), multi-DB design, normalization, project status | PI Ch. 15 | Lab 10 |
| Wk12 (Nov 6) | Databases, continued | PI Ch. 15 | |
| Wk13 (Nov 13) | Introduction to Pandas, dataframes/series, project status | - | Lab 11 |
| Wk14 (Nov 20) | Data processing/analysis/visualization | - | Lab 12 |
| Wk15 (Nov 27) | Course review, final exam review, project presentations, course evaluations | - | |
| Final (Dec 11) | | | Final Exam |

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://capsnet.usc.edu/departments/departments-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students.

The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.