



## **INF510: Principles of Programming for Data Science**

**Units: 4**

**Fall 2019**

**Lecture: Wednesdays, 12pm-1:30pm**

**Lab: Wednesdays, 9am-10:50am**

**Location: OHE100D**

**Instructor: Dr. Jeremy Abramson**

**Office: GER 202B**

**Office Hours: Wednesdays 1:30pm – 2:30pm (or by appointment at ISI)**

**Contact Info: [abramson @ isi.edu](mailto:abramson@isi.edu)**

**Teaching Assistant: TBD**

**Office: TBD**

**Office Hours: TDB**

**Contact Info: TBD**

### **Course 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.

### **Learning Objectives and Outcomes**

This course is designed to serve as an introduction to computer science concepts and basic programming skills that are specifically geared toward data science, and forms a part of the introductory coursework for a Data Science degree. 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, timed interactive labs, a mid-term exam, and a final project.

**Prerequisite(s):** N/A

**Co-Requisite(s):** N/A

**Concurrent Enrollment:** N/A (although often take concurrently with INF549)

**Recommended Preparation:** Basic understanding of computing systems and statistics is desirable but not required

## Course Notes

This course is offered as both DEN and on-campus sections; please make sure you are enrolled under the appropriate one.

## Required Readings and Supplementary Materials

“Think Python, 2<sup>nd</sup> Edition” (“TP”) is available for download (free) or purchase here:

<https://greenteapress.com/wp/think-python-2e/>

**Helpful, but not required:** Python for Data Analysis, by Wes McKinney

Other links and readings will be distributed throughout the semester.

## Grading Breakdown

Course Deliverable	% of Grade
Homeworks	20
Labs	15
Midterm	25
Final Project	35
Course Participation	5
<b>TOTAL</b>	<b>100</b>

## Grading Scale (Example)

Course final grades will be determined using the following scale

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

**NOTE:** The instructor reserves the right to alter this grading scheme (i.e. “curve” the class) if appropriate. This is almost always to the benefit of students

## Description and Assessment of Assignments

Homework assignments are to be done *individually* (unless otherwise explicitly noted). Assignments can include a set of exercises from the textbook and may include additional questions from outside sources.

Labs will be assigned [roughly] once a week. These assignments reinforce the content discussed in lecture. Labs will be done either individually or in pairs, which will be specified along with the lab instructions.

The midterm will be a written exam at roughly the halfway point of the course, covering all material up to that point.

Toward the end of the class, there will be a final programming project that will address a number of data acquisition, modeling, processing and analysis techniques that were taught throughout the semester. This will be done individually (unless explicitly given permission by the instructor) and will be due the day of the final. There will be a number of “milestones” for this project which will count toward the project grade.

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. Course participation includes asking and answering questions in class session, and contributing to course discussions.

### **Assignment Rubrics**

Homework assignments, labs and the final project will be graded on code clarity (including but not limited to code style, comments and documentation), completeness and correctness. Code that does not complete or returns an “error” will be graded harshly. All code should be well documented and commented. Code efficiency is not paramount, but all solutions so be able to run in a reasonable amount of time given the task to complete.

### **Assignment Submission Policy**

Homework will be submitted via the course website on DEN. Labs may be “checked off” during lab session, depending on the particular week. The course producer will inform you if late submissions of labs is acceptable.

### **Grading Timeline**

All assignments are due by the time given on DEN. Each student will be allotted a total of **three** “slack days” (to mitigate sickness, travel or other absences) to allow for late submission of homeworks. They can be used all at once or on different assignments. Once a student’s slack days are used, a late homework assignment receives a score of **zero** (unless otherwise mitigated by university policy).

Slack days *cannot* be used on labs, the midterm or the final project/final project milestones.

### **Additional Policies**

“Make up” assignments, lectures and labs are not explicitly provided, including assignments missed due to registration delays. There may be opportunities for makeups or “extra credit” throughout the semester.

While you are not explicitly “required” to attend class, as noted above, course participation is 5% of your grade.

## Course Schedule: A Weekly Breakdown

NOTE: This schedule may be modified as needed, due to course dynamics, etc.

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
<b>Week 1</b>	Introduction, programming practices, functions	TP 1-3	Lab 1 (take home)
<b>Week 2</b>	Python syntax: variable types, conditionals, iteration	TP 1-3, 5, 7	Lab 2 Homework 1
<b>Week 3</b>	Python syntax II: functions revisited, exception handling, putting it all together	TP 4, 6	Lab 3 Homework 2
<b>Week 4</b>	Python syntax III: Data structures. Lists, dicts, tuples, sets	TP 10-12	Lab 4
<b>Week 5</b>	Strings and dates, file and CSV processing	TP 8, 13-14	Lab 5 Homework 3
<b>Week 6</b>	Object oriented programming	TP 15-18	Lab 6
<b>Week 7</b>	Advanced Python syntax (lambda functions, iterators, comprehensions), midterm review	TP 19	Lab 7 Homework 4
<b>Week 8</b>	Midterm		
<b>Week 9</b>	Network access, APIs/JSON, web scraping		Make-up lab
<b>Week 10</b>	Databases and SQLI		Lab 8 Project Part 1 Homework 5
<b>Week 11</b>	SQL II and Pandas I		Lab 9
<b>Week 12</b>	Pandas II		Lab 10 Project Part 2
<b>Week 13</b>	Data visualization and analysis I		Lab 11 Homework 6
<b>Week 14</b>	Data visualization and analysis II		Lab 12 Project Part 3
<b>Week 15</b>	Course evaluations, project reviews		Lab 13
<b>FINAL</b>	<b>Final project Due</b>		Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at <a href="http://classes.usc.edu/">classes.usc.edu/</a> .

## 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 Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

### Support Systems:

*Student Health Counseling Services - (213) 740-7711 – 24/7 on call*  
[engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call*  
[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call*  
[engemannshc.usc.edu/rsvp](http://engemannshc.usc.edu/rsvp)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED) | Title IX - (213) 740-5086*  
[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

*Bias Assessment Response and Support - (213) 740-2421*  
[studentaffairs.usc.edu/bias-assessment-response-support](http://studentaffairs.usc.edu/bias-assessment-response-support)

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

*The Office of Disability Services and Programs - (213) 740-0776*  
[dsp.usc.edu](http://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*USC Support and Advocacy - (213) 821-4710*  
[studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity at USC - (213) 740-2101*

[diversity.usc.edu](http://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

[dps.usc.edu](http://dps.usc.edu), [emergency.usc.edu](http://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call*

[dps.usc.edu](http://dps.usc.edu)

Non-emergency assistance or information.