San José State University  
General Engineering Department  
ENGR 120-01, Programming Concepts for Behavioral and Social Science Applications, Fall 2019

BASIC COURSE INFORMATION

Instructor: Valerie Carr  
Office Location: Dudley Moorhead Hall (DMH), Room 318  
Telephone: (408) 924-5630  
Email: valerie.carr@sjsu.edu  
Office Hours: Tues/Thurs, 2:00 – 3:00pm, and by appointment  
Class Days/Time: Tues/Thurs, 12:00 – 1:15pm  
Classroom: Engineering 339  
Prerequisites: One of the following: STAT 95, MATH 30, or MATH 71

INSTRUCTIONAL STUDENT ASSISTANTS (ISAs)

ISA #1: TBD  
Office Hours: TBD  
Email: TBD

ISA #2: TBD  
Office Hours: TBD  
Email: TBD

COURSE DESCRIPTION

In this course, we will cover the application of Python programming to the fields of behavioral and social sciences, as well as the basic building blocks of computers and the web. This course also covers how programming is used in various careers. As such, this course aims to provide you with a strong foundational knowledge of programming in Python and how this knowledge can be applied to solving real-world social science problems.
COURSE FORMAT

Each class session will include a mix of (1) lecture that introduces programming concepts and examples, and (2) hands-on laboratory work performed with a partner. During lectures, the instructor will cover programming concepts and provide demonstrations to facilitate understanding of these concepts. Students will then participate in laboratory exercises to gain hands-on experience of concepts covered in lecture. As such, regular attendance and active participation in lab activities are essential for learning and succeeding in the course. If possible, students should bring a laptop to class for use in laboratory exercises, but owning a laptop is not a requirement for taking this course – please see below for borrowing/renting options. Students will be assessed via homework problems, quizzes, and a final project.

Given that the format and content of this course is quite different than that of typical social science courses, it is especially important that you stay on top of your homework and regularly practice your new skills. Unlike many of your other courses, this is not a course in which you can cram at the last minute! Should you miss a class, it is extremely important to find out what you missed, preferably by contacting one of your fellow students, and to practice lab activities on your own. Being proactive about seeking help is similarly important in achieving a successful outcome. Please ask questions when you don’t understand information in lecture, laboratory activities, or readings—asking questions and offering ideas is welcomed and encouraged!

CANVAS

Course materials such as the syllabus, homework assignments, announcements, grades, etc. can be found on the Canvas learning management system course website at http://sjsu.instructure.com. You are responsible for regularly checking Canvas to learn of any updates.

COURSE LEARNING OUTCOMES (CLO)

Upon successful completion of this course, students will be able to:

- **Conceptual goals**
  - CLO1: Demonstrate the ability to break down a problem into constituent sub-problems
  - CLO2: Develop and implement solutions to problems in Python
  - CLO3: Demonstrate knowledge of basic algorithms in solving problems
  - CLO4: Use library functions in developing solutions
  - CLO5: Write clear and concise documentation of problems and their solutions
  - CLO6: Demonstrate knowledge of major building blocks of computers and the web
  - Conceptual goals will be assessed via homework and quizzes

- **Application goals**
  - CLO7: Apply programming concepts and skills to solve student-selected problems
  - CLO8: Articulate the relevance of programming to students’ field of study and careers
  - Application goals will be assessed with homework, quizzes, and the final project

RECOMMENDED TEXTS/READINGS

There is no required textbook in this course. However, given that many of you are new to programming, it will be very useful to have a reference to turn to that further explains course concepts and provides additional practice problems. As such, I recommend that you purchase the following textbook:

You may also benefit from using these free, online resources for learning Python:


**COMPUTING RESOURCES**

As noted above, to participate in in-class lab activities, you will need to use a laptop. If you do not own a laptop, several options are available to you. First, for in-class lab activities, we will be doing pair programming, which refers to programming with a partner and regularly switching who is the “driver” and who is the “navigator”. As such, one option for students without a laptop is to simply pair with a classmate who does own a laptop – something which can be worked out during the first week of class. Second, if you prefer to work with your own laptop, you can rent one from the library or Associated Students as detailed below. Finally, for completing homework assignments, studying for quizzes, and working on your final project, you may use one of the computers labs in the Engineering building, as detailed below.

**Borrowing/renting laptops**

Laptops can be borrowed from the library for free for up to one week. Please see the MLK Library website for more details at: https://library.sjsu.edu/scs. They can also be rented through Associated Students for up to a month ($30/month). Please see the Associated Students website for more details at http://as.sjsu.edu/asptc/index.jsp?val=ptc_laptoprental.

**Computer labs**

Most computer labs on campus will *not* have the necessary software installed that is required for this class. As such, please use the following computer lab in the Engineering building which is well-equipped for our needs: Engineering 390.

**COURSE REQUIREMENTS AND ASSIGNMENTS**

During this course, you will be required to participate in class and to complete the following: Homework, quizzes, and a final project (see details below in “Grading Information” and “Schedule”). Students will use the Jupyter environment for programming activities, assignments, and projects.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Please review the following sources and policies, as well:

• [University Syllabus Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf)
• Office of Graduate and Undergraduate Programs’ [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/)
GRADING INFORMATION

Letter grades

Grades will be based on homework (30%), quizzes (50%), and a final project (20%). Letter grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97.00 – 100.00</td>
</tr>
<tr>
<td>A</td>
<td>93.00 – 96.99</td>
</tr>
<tr>
<td>A-</td>
<td>90.00 – 92.99</td>
</tr>
<tr>
<td>B+</td>
<td>87.00 – 89.99</td>
</tr>
<tr>
<td>B</td>
<td>83.00 – 86.99</td>
</tr>
<tr>
<td>B-</td>
<td>80.00 – 82.99</td>
</tr>
<tr>
<td>C+</td>
<td>77.00 – 79.99</td>
</tr>
<tr>
<td>C</td>
<td>73.00 – 76.99</td>
</tr>
<tr>
<td>C-</td>
<td>70.00 – 72.99</td>
</tr>
<tr>
<td>D+</td>
<td>67.00 – 69.99</td>
</tr>
<tr>
<td>D</td>
<td>63.00 – 66.99</td>
</tr>
<tr>
<td>D-</td>
<td>60.00 – 62.99</td>
</tr>
<tr>
<td>F</td>
<td>0.00 – 59.99</td>
</tr>
</tbody>
</table>

Weighting of graded assignments

Homework (30%)
Throughout the semester, you will be required to complete weekly homework assignments (13 total) in the form of problem sets in Jupyter Notebook. No late problem sets will be accepted, but I will allow each student to drop their lowest score, such that the remaining 12 problem sets count towards your grade. All homework will be checked for plagiarism.

Quizzes (50%)
Quizzes will test your conceptual knowledge from lecture as well as your programming skills practiced via laboratory activities and homework assignments. Your lowest quiz score out of the seven quizzes will be dropped, such that the remaining six quizzes will count towards your grade. Please note that no makeup quizzes will be given except in emergency situations in which documentation is provided by an independent authority (e.g., a doctor’s note).

Final project (20%)
The culminating assignment for this course is a final project of your choosing. You will work in groups of 2-3 students on a project that applies Python to a social science question of your choice. Your group will be required to turn in your code for the project, and to give a slide presentation. This assignment will be discussed in greater detail later in the semester.

Extra credit
You will have two opportunities to receive extra credit in this class. First, you will receive extra credit if you are present for all in-class lab activities (i.e., perfect attendance). Second, you may conduct an informational interview with someone working in a position that requires knowledge of computer programming. This second opportunity will be discussed in greater detail later in the semester.

Attendance
As per the University Attendance and Participation Policy F15-12 at http://www.sjsu.edu/senate/docs/F15-12.pdf, “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Submitting assignments
All assignments are due by the beginning of class on the specified due date. Students are expected to start problem sets early enough to allow for time to analyze the problems, write the necessary code, and debug the code as needed.
All problem sets will be submitted via Canvas as PDFs of your Jupyter Notebooks (this will make more sense once you learn how to use Jupyter!). Late homework will not be accepted. If you know in advance that you will be traveling and unable to submit an assignment on the due date, you must submit it in advance of the due date. **It is your responsibility to ensure that submitted files are properly uploaded and complete by the due date.** As such, blank/incomplete/corrupt files will not be accepted, similar to how a blank piece of paper would never be accepted in class. I suggest beginning the submission process at least 30 mins in advance of each deadline to ensure sufficient time to correctly upload your files and address any Canvas-related difficulties.

**Academic integrity**

Cheating, plagiarism, or other forms of academic dishonesty that are intended to gain unfair academic advantage will not be tolerated. If evidence of academic misconduct is found, you will receive a zero on the assignment(s) in question, and I will file a report with the Office of Student Conduct & Ethical Development. See the [office's website](http://www.sjsu.edu/studentconduct/policies/) for more information at [http://www.sjsu.edu/studentconduct/policies/](http://www.sjsu.edu/studentconduct/policies/).

**Viewing grades**

Grades will be posted on Canvas in a timely manner. Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at [http://www.sjsu.edu/senate/docs/F13-1.pdf](http://www.sjsu.edu/senate/docs/F13-1.pdf) for more details.

**CLASSROOM PROTOCOL**

Students are expected to maintain a level of professional and courteous behavior at all times. You are required to silence your cell phones before the beginning of class. Laptops are to be used for note-taking and lab activities only. I expect you to be respectful of your fellow classmates such that you do not distract them by browsing the internet or chatting online during class. Students not abiding by these policies will be asked to leave the room.

**DIVERSITY STATEMENT**

It is my goal to create a safe and diversity-sensitive learning environment that respects the rights, dignity, and welfare of all students, faculty, and staff. Diversity means the fair representation of all groups of individuals, the inclusion of minority perspectives and voices, and appreciation of different cultural and socioeconomic group practices.

**UNIVERSITY POLICIES**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at [http://www.sjsu.edu/gup/syllabusinfo/](http://www.sjsu.edu/gup/syllabusinfo/).
# COURSE SCHEDULE

Note: The schedule is subject to modification (with fair warning) as the instructor deems necessary.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Homework/quiz dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 22</td>
<td>Welcome; Installing Python+Jupyter</td>
<td>[none]</td>
<td></td>
</tr>
<tr>
<td>Aug 27</td>
<td>Jupyter notebook</td>
<td>[none]</td>
<td></td>
</tr>
<tr>
<td>Aug 29</td>
<td>Intro to data types</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Sep 3</td>
<td>Strings I</td>
<td>2.2</td>
<td>Quiz 1</td>
</tr>
<tr>
<td>Sep 5</td>
<td>Lists and tuples I</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Sep 10</td>
<td>Lists and tuples II</td>
<td>2.3, 2.4</td>
<td></td>
</tr>
<tr>
<td>Sep 12</td>
<td>Intro to programs</td>
<td>2.5, 3.1</td>
<td></td>
</tr>
<tr>
<td>Sep 17</td>
<td>Conditionals and iteration I</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Sep 19</td>
<td>Conditionals and iteration II</td>
<td>3.2</td>
<td>Quiz 2</td>
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<tr>
<td>Sep 24</td>
<td>Functions I</td>
<td>3.3</td>
<td></td>
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<tr>
<td>Sep 26</td>
<td>Functions II</td>
<td>3.4, 3.5</td>
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</tr>
<tr>
<td>Oct 1</td>
<td>Functions III</td>
<td>[none]</td>
<td></td>
</tr>
<tr>
<td>Oct 3</td>
<td>Strings II</td>
<td>4.1</td>
<td>Quiz 3</td>
</tr>
<tr>
<td>Oct 8</td>
<td>Strings III</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>Oct 10</td>
<td>Formatting output</td>
<td>4.2</td>
<td></td>
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<tr>
<td>Oct 15</td>
<td>File input and output</td>
<td>4.3</td>
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<tr>
<td>Oct 17</td>
<td>Data analysis I</td>
<td>[none]</td>
<td>Quiz 4</td>
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<tr>
<td>Oct 22</td>
<td>Data analysis II (VC away)</td>
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<tr>
<td>Oct 24</td>
<td>Data viz</td>
<td>[none]</td>
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<td>Oct 29</td>
<td>Career panel</td>
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<td>Oct 31</td>
<td>Final project discussion</td>
<td>[none]</td>
<td>Quiz 5</td>
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<tr>
<td>Nov 5</td>
<td>Complex conditionals</td>
<td>5.1, 5.2</td>
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<tr>
<td>Nov 7</td>
<td>Iteration I</td>
<td>5.2</td>
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<tr>
<td>Nov 12</td>
<td>Iteration II</td>
<td>5.4, 5.5, 5.6</td>
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<tr>
<td>Nov 14</td>
<td>Dictionaries I</td>
<td>6.1</td>
<td>Quiz 6</td>
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<tr>
<td>Nov 19</td>
<td>Dictionaries II</td>
<td>6.1</td>
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<tr>
<td>Nov 21</td>
<td>Web scraping I</td>
<td>11.1, 11.2</td>
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<tr>
<td>Nov 26</td>
<td>Web scraping II</td>
<td>11.3</td>
<td></td>
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<tr>
<td>Nov 28</td>
<td>No class, Thanksgiving</td>
<td></td>
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<tr>
<td>Dec 3</td>
<td>Regular expressions</td>
<td>11.3</td>
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<tr>
<td>Dec 5</td>
<td>Final project group work</td>
<td></td>
<td>Quiz 7</td>
</tr>
<tr>
<td>Dec 17</td>
<td><strong>Final project due, presentations</strong>, 9:45am - 12pm</td>
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