

San José State University
Computer Science Department
CS 22B: Python Programming for Non-Majors II
Section 01, Spring 2018

Course and Contact Information:

Instructor:	Sami Khuri
Office Location:	MacQuarrie Hall 207 (MH 207)
Telephone:	(408) 924-5081
Email:	sami.khuri@sjsu.edu
Office Hours:	By Appointment
Class Days/Time:	Tuesdays & Thursdays at 3:00-4:15 pm
Classroom:	MacQuarrie Hall (MH) 422
Prerequisites:	CS22A or consent of the instructor. This course is intended for students pursuing a Minor in Bioinformatics.

Course Format:

Class time will be spent either in “lecture” mode or in “lab” mode, explained in “Class Protocol”.
You are required to bring your wireless laptop to each class.
Exams will be in-class, hand-written, closed book.

Canvas Learning Management System and Messaging:

Course materials such as syllabus, handouts, notes, hands-on exercises, project instructions, etc. can be found on the [Canvas Learning Management System course login website](http://sjsu.instructure.com) at <http://sjsu.instructure.com>.
You are responsible for regularly checking with the Canvas messaging system to learn of any updates.

Course Description:

Hands-on Python programming skills. Skills include casting a problem as an algorithm, translating an algorithm to executable code, and debugging and testing code. Applications focus on computational techniques to understand, analyze, and visualize data. This course is not open to computer science majors or minors, or software engineering majors.

Note: We will continue covering Python with a bias towards examples drawn from Biology.

Course Learning Outcomes (CLO):

Upon successful completion of CS22B, students will be able to:

1. Write programs using various data types, and using basic techniques such as assignment, function calls, loops, and conditionals.
2. Use and manipulate several built-in data structures such as lists, arrays, and dictionaries, including nested data structures.
3. Read and write data to and from text files, both as plain text and in structured formats.
4. Break a medium sized problem down into smaller parts and solve each sub-problem individually.
5. Test and debug programs.
6. Deal with data that may include missing elements or malformed representations.
7. Use objects and associated methods provided by the programming language.
8. Implement objects and associated methods.
9. Write programs that are easy to understand so that others may modify and improve them.
10. Make effective use of computational methods in their chosen field.
11. Acquire computational skills that give an edge in competing for jobs.

Required Texts/Readings:

Advanced Python for Biologists by Martin Jones, 2014, ISBN-13: 978-1495244377, ISBN-10: 1495244377.

Note: The author is a biologist. This book, as well as *Python for Biologists*, were written especially for scientists who are new to programming. The author maintains a website for the books at <http://pythonforbiologists.com>.

Note: We will cover all eight chapters of the book, but we will spend more time on chapters 2, 3, and 4.

Recommended Texts/Readings:

- Introducing Python, by Bill Lubanovitch, November 2014: ISBN: 978-1-449-35936-2: <http://shop.oreilly.com/product/0636920028659.do>
- Think Python, 2nd Edition, by Allen B. Downey, O'Reilly Media, December 2015. Available free at <http://greenteapress.com/wp/think-python-2e/> and from O'Reilly at <http://shop.oreilly.com/product/0636920045267.do>
- Python in a Nutshell, April 2017: <http://shop.oreilly.com/product/0636920012610.do>
- Fluent Python (Advanced), August 2015: <http://shop.oreilly.com/product/0636920032519.do>
- Flask Web Development, May 2014: <http://shop.oreilly.com/product/0636920031116.do>
- Python Data Science Handbook, November 2016: <http://shop.oreilly.com/product/0636920034919.do>
- Programming in Python 3 (2nd edition): Mark Summerfield - Addison Wesley, ISBN: 0-321-68056-1
- Dive into Python 3, Mark Pilgrim, October 2009 – <http://www.diveintopython3.net/> Apress ISBN: 978-1430224150

Other Readings:

Additional course readings, examples, exercises, etc. will be assigned and will be provided by the instructor.

Course Requirements and Assignments:

1. Hands-On Exercises (20%):

We will have a number of hands-on exercises. The purpose of the hands-on exercises is to develop your understanding of the material and your skills in problem-solving and in programming. Occasionally, you will be asked to come to the front of the class to go through your solutions (programs) and share them with (explain them to) the rest of the class.

2. **Problem Sets (20%):** Five problem sets that reinforce lecture and practical skills will be assigned. The purpose of the assignments is to develop your understanding of the material and your skills in problem-solving and in programming. Problem sets will be submitted via Canvas for grading. Please note that you will be responsible for knowing/understanding the content in all Problem Set questions. Only a subset of the assigned problems will be graded (per homework). No late homework will be accepted. However, under exceptional circumstances, one problem set per student might be accepted late. It will need to be handed in prior to the following class meeting and will be graded with 30% off. Such an extension should be requested from the instructor. Assignments are due in the beginning of the lecture on the following dates:
- HW One due on Thursday, February 8, 2018. Submit at Canvas by 2:59pm.
 - HW Two due on Thursday, February 22, 2018. Submit at Canvas by 2:59pm.
 - HW Three due on Thursday, March 15, 2018. Submit at Canvas by 2:59pm.
 - HW Four due on Thursday, April 5, 2018. Submit at Canvas by 2:59pm.
 - HW Five due on Thursday, April 26, 2018. Submit at Canvas by 2:59pm.
3. **Term-Project (20%):**
There will be a programming group project. Each group consists of two students. Information on the project, including topics and deadlines, will be given later. Each group gives a 20-minute, in-class presentation (10 minutes per student) on May 8 or 10, 2018, during class time.
The term-project is due on Tuesday, May 8, 2018.
4. **Term Exams (20%):**
Exam One: Thursday, March 8, 2018.
Exam Two: Thursday, April 19, 2018.
- Exam One and Exam Two are each one hour and fifteen minutes long. All exams are in-class, closed-book and comprehensive.
Make-up exams will be given only at the instructor's discretion.
Note: *If you fall behind, you will likely do poorly on the exams as well.*
5. **Final Exam (20%):**
A cumulative Final Exam will be given on Friday, May 18, from 2:45 to 5:00pm.

Grading Information:

Grade calculation will be based on the following:

- Hands-On Exercises (20%)
- Five Assignments/Problem Sets (20%)
- Term Project (20%)
- Two Term Exams (20%)
- Final Examination (20%)

Incomplete work: Points will be deducted for incomplete question responses and solutions that are partially functional. Consult individual assignment for details of point allocation for each problem.

Late assignments: Assignments submitted after their specified due date and time will be deducted 20% total points for the assignment for each day past the due date/time.

Makeup Exams: You must submit only your own work on exams. Makeup exams will only be given in cases of illness (documented by a doctor) or in cases of documentable, extreme emergency.

Grade Scale:

Point Range	Letter Grade
97.0 - 100	A+
93.0 – 96.99	A
90.0 - 92.99	A-
87.0 - 89.99	B+
82.0 - 86.99	B
80.0 - 81.99	B-
77.0 - 79.99	C+
72.0 - 76.99	C
70.0 - 71.99	C-
67.0 - 69.99	D+
62.0 - 66.99	D
60.0 - 61.99	D-
<60.0	F

No Extra Credit Assignments will be given.

Classroom Protocol:

- **Dual Role of MH422: Lecture/Lab**

MH422 will be used as a dual-purpose room. It can be a regular **lecture room** or it can be a **computer laboratory** for hands-on exercises.

Lecture Mode: This is when MH422 is used as a regular lecture room. Students are expected to listen and follow the lecture. Be considerate to your classmates and follow the lecture. Do not use the computer and/or talk to your neighbor.

Lab Mode: This is when MH422 is used as a computer lab. Use the computers. Work collaboratively on problems of the Hands-On and share your ideas and solutions with your classmates.

We shall alternate between the two modes. A typical class will begin with a lecture (Lecture Mode) followed by a hands-on (Lab Mode).

- Regular class attendance is highly recommended and strongly encouraged.
- Please arrive to class on-time so that you benefit fully from the course experience and you do not disturb classmates and the instructor while class is in session.
- Students are responsible for knowing all materials covered in class lectures, readings, assignments, and other course-related work.
- Please do not use mobile phones during class time. Laptops, tablets and other devices should only be used for course-related purposes.

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/>

CS 22B, Advanced Python Programming for Non-Majors II, Spring 2018

Please note that I am chairing two search committees this Spring and may occasionally have to miss classes. When that happens, course TA, Akriti Sethi, will substitute for me.

The course schedule is subject to change with fair notice. Changes will be announced on Canvas.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	1/25	Green Sheet, Introductions, Course Expectations, Python Interpreter and Python Coding Style and Book (MJ) Chapter One and Review <i>Hands-On One and Hands-On Two</i>
2	1/30	MJ Chapter One, Introduction, pages 1 – 8, and Review <i>Hands-On Two</i>
2	2/1	MJ Chapter Two, Recursion and Trees, pages 9 – 32 <i>Hands-On Three</i>
3	2/6	MJ Chapter Two, Recursion and Trees, pages 9 – 32 [Continuation] <i>Hands-On Three</i>
3	2/8	MJ Chapter Two, Recursion and Trees, pages 9 – 32 [Continuation] <i>Hands-On Three</i>
4	2/13	MJ Chapter Two, Recursion and Trees, pages 9 – 32 [Continuation] <i>Hands-On Four</i>
4	2/15	MJ Chapter Two, Recursion and Trees, pages 9 – 32 [Continuation] <i>Hands-On Four</i>
5	2/20	MJ Chapter Two, Recursion and Trees, pages 9 – 32 [Continuation] <i>Hands-On Four</i>
5	2/22	MJ Chapter Three, Complex Data Structures, pages 33 - 60 <i>Hands-On Five</i>
6	2/27	MJ Chapter Three, Complex Data Structures, pages 33 - 60 [Continuation] <i>Hands-On Five</i>
6	3/1	MJ Chapter Three, Complex Data Structures, pages 33 - 60 [Continuation] <i>Hands-On Five</i>
7	3/6	MJ Chapter Three, Complex Data Structures, pages 33 - 60 [Continuation] <i>Hands-On Five</i>
7	3/8	Exam One
8	3/13	MJ Chapter Four, Object-Oriented Python, pages 61 – 105 <i>Hands-On Six</i>
8	3/15	MJ Chapter Four, Object-Oriented Python, pages 61 – 105 [Continuation] <i>Hands-On Six</i>

Week	Date	Topics, Readings, Assignments, Deadlines
9	3/20	MJ Chapter Four, Object-Oriented Python, pages 61 – 105 [Continuation] <i>Hands-On Six</i>
9	3/22	MJ Chapter Four, Object-Oriented Python, pages 61 – 105 [Continuation] <i>Hands-On Six</i>
10	3/27	Spring Break
10	3/29	Spring Break
11	4/3	MJ Chapter Four, Object-Oriented Python, pages 61 – 105 [Continuation] <i>Hands-On Seven</i>
11	4/5	MJ Chapter Four, Object-Oriented Python, pages 61 – 105 [Continuation] <i>Hands-On Seven</i>
12	4/10	MJ Chapter Five, Functional Python, pages 106 – 154 <i>Hands-On Eight</i>
12	4/12	MJ Chapter Five, Functional Python, pages 106 – 154 [Continuation] <i>Hands-On Eight</i>
13	4/17	Review <i>Hands-On Nine</i>
13	4/19	Exam Two
14	4/24	MJ Chapter Six, Iterators, Comprehensions, and Generators, pages 155 – 177 <i>Hands-On Ten</i>
14	4/26	MJ Chapter Seven, Exception Handling, pages 178 – 215 <i>Hands-On Eleven</i>
15	5/1	MJ Chapter Seven, Exception Handling, pages 178 – 215 [Continuation] <i>Hands-On Eleven</i>
15	5/3	MJ Chapter Eight, Modules and Testing, pages 216 – 252 <i>Hands-On Twelve</i>
16	5/8	Projects Due In-Class Presentations
16	5/10	In-Class Presentations (Continuation) and General Review
Final Exam		Friday, May 18 (2:45-5:00pm) in MH 422 Cumulative Final