Department of Electrical & Computer Engineering

CPE 551A – Engineering Programming: Python

Fall 2021

Course Name:	Engineering Programming: Python
Credits:	3
Classroom:	Babbio 104 Building https://stevens.zoom.us/j/98519194655
Class Hours:	Thursday, 6:30-9:00 PM
Office Hours:	Thursday, 5:30–6:30 PM, and by appointment
Instructor:	Yousef Abdelmalek, PhD
Teaching Assistant	Hatim Alhazmi (halhazm1@stevens.edu)
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Required Textbook

Learning Python (5E) by Mark Lutz.

Materials

- All other materials (code) and slides will be uploaded to course canvas/github website
- Think Python, by Allen B. Downey, second edition, O'Reilly, Sebastopol, California.
- How to think like a Computer Scientist by Downey, Elkner, Meyers
- Canvas will be used for sharing assignment links and grades

Prerequisite Course and Knowledge

- Basic knowledge of programming

Course Description

This course presents tool, techniques, algorithms, and programming techniques using the Python Programming language for data intensive applications and decision making. The course formally introduces techniques to: (i) gather,(ii) store, and (iii) process large volumes of data to make informed decisions. Such techniques find applicability in many engineering application areas, including communications systems, embedded systems, smart grids, robotics, Internet, and enterprise networks, or any network where information flows and alters decision making.

Learning Objectives

The objectives are to

- learn how to design and program python applications
- learn how to use lists, tuples, and dictionaries in python programs
- learn how to write loops and decision statements in python
- learn how to read and write files in python.
- extract and analyze data in python
- learn how to use indexing and slicing to access data in python programs.

- prepare for their future career in Technology related fields

Course Methodology

- I believe that students learn best by doing, so writing python programs, and classes will include dynamic illustrations of the concepts. Students are expected to bring their laptops and run the programs in their own laptops.
- It is also helpful to study incomplete and incorrect solutions
- There will be weekly coding assignments. The students will return assignments via github which will be tested using continuous integration tool Travis-CI.
- There will be pop quizzes at the end of some classes

Course Requirements

Attendance. Students are required to attend all lectures. Four random attendance signoffs will be performed. Each student is permitted one absence per semester without penalty. Excused absences (religious or medical, noted in via email to the professor prior to the absence occurring) accompanied by proper documentation will not lead to point deductions.

Homework. There will be weekly homework assignments throughout this course. The due date of each assignment is usually two weeks after the date when the homework is assigned. 5 points will be deduced each day after the due date. **400 points possible.**

Course Project. There will be an individual/team project of the course. For team projects, the tasks and contributions of each team member must be clearly documented. There will be three milestones for the project: *proposal*, *mid-stage report*, and *final report & presentation*. The proposal will be up to 1-page description of the topic of the project and tentative plan. The mid-stage report will be at least three pages to summarize the progress. At the end of the semester each team will deliver a presentation (one per team), which includes the final report (in one PDF file, 6 pages minimum). The course project will be graded as follows:

- 1-page proposal, 15 points
- 3-page mid-stage report, 25 points
- Code - Presentation, 40 points
- The writing of the final report, 20 points

The course project has totally **100 points possible**.

Quizzes. 100 points possible

Exams. There will be one mid-term exam and final exam for this course. There is no makeup exam. Excused absence from any exam shall seek consent from the instructor before the exam day; rearrangement can be scheduled only if a student has a physical problem evidenced by Doctor's prescription. **400 points possible**.

Grading Procedures

- Homework & attendance (40 %) 400 points
- Project/Presentation (10 %) 100 points
- Quizzes (10 %) 100 points
- Mid-term Exams (20 %) 200 points
- Final Exam (20 %) 200 points

Tentative Course Schedule

The following is a tentative course schedule. Any changes to this schedule will be communicated to students via email or during the lecture.

Week	Topics	Assignment
Sep 2	Introduction to Programming Python	Survey
Sep 9	The Python programming Language, Introducing Python interpreter, Introducing modern tools for Python programming such as PyCharm, ipython notebook, Debugging, The first program in Python, review of git and github	HW#1
Sep 16	Introducing Python Object Types, Numeric Types, The dynamic Typing Interlude, String Fundamentals, Lists and Dictionaries, Tuples	HW#2
Sep 23	Assignments, Expressions, if Statements, while and for loops, iterations and comprehensions	HW#3
Sep 30	Function Basics, Scopes, Arguments, Advanced Function Topics	HW#4
Oct 7	Comprehensions and Generations, The benchmarking Interlude	HW#5
Oct 14	Modules: The Big Picture, Module Coding Basics, Module Packages	HW#6
	Midterm exam	
Oct 21	OOP: The Big Picture, Class Coding Basics, A More	HW#7

	Realistic Example, Class Coding Details	
Oct 28	Operator Overloading, Designing with Classes	HW#8
Nov 04	Exception Basics, Exception Coding Details, Exception Objects	HW#9
Nov 11	Example: Implement a Data Structure Linked List	HW#10
Nov 18	Example: Implement Data Structures Stacks and Queues	
Nov 25	Thanksgiving (no classes)	
Dec 02	Example: Implement a Data Structure Trees Introducing popular Python libraries such as Numpy, pandas, scikit-learn	
Dec 09	Final Exam	

Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at www.stevens.edu/provost/graduate-academics.

Learning Accommodations

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage

independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies. For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/office-disability-services. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone (201) 216-3748.

Inclusivity

Name and Pronoun Usage. As this course includes group work and in-class discussion, it is vitally important for the class to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement. Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements. Students in this class are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

Questions to Your Grades

You may request the instructor to reevaluate your homework, examinations, course project, and other course materials if you have any question to your course grade. Written request must be submitted to the instructor within seven (7) calendar days after the grade was assigned.