

MET CS 521

Information Structures with Python

2026 Spring 2 (March 10–April 27)

4 credits

This course presents an effective approach to learn Python. With extensive use of graphical illustrations, it will build understanding of Python and its capabilities by learning through many simple examples and analogies. The class will involve active student participation, discussions, and programming exercises. This approach will help build a strong foundation in Python programming that can be used effectively in real-job situations and future courses.

Prerequisites

Familiarity with at least one programming language. Understanding of key language constructs and methods. Ability to formulate quantitative information symbolically and numerically.

Learning Objectives

By successfully completing this course students will be able to:

- Use Python programming language constructs to implement a variety of analytical and computational methods (searching and sorting)
- Explain tradeoffs between different Python methods and data structures in computation
- Apply acquired skills in diverse settings by completing a course project of their choosing
- Present both symbolic and visual results their course project
- Articulate the advantages and limitations of using Python

To accomplish this goal, course materials are divided into a set of mini-modules corresponding to particular topic(s). These mini-modules will typically include the following:

- Course material with many examples
- Self-test questions
- Sample programming problems including typical Python job interview questions (collected from various sources in the internet)

Instructional Team

Instructor: Dimitar Trajanov
Computer Science Department
Metropolitan College
Boston University
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Materials

Required Book

Contemporary programming languages like Python enjoy rich online documentation. Indeed, they are built on the premise that programmers are continually in contact with such documentation and are not expected to memorize any but a small fraction of it. The textbook for the course is below. There will be readings from the text weekly. The text will be used in conjunction with the online course modules and online Python documentation.
image of book cover

Punch, W. and Enbody, R. (2016). *The Practice of Computing Using Python* (3rd ed.). Pearson. ISBN-13: 978-0-13-437976-0

This book can be purchased from Barnes and Noble at Boston University. An e-book is available at VitalSource.com. An e-book is available through the BU bookstore.

Note: You do not need to purchase the textbook "with access," also referred to as the "lab" portion of this text. It will not be used in this course.

Running Python Programs

We will be using Spyder IDE (Integrated Development Environment) and Anaconda Python Distribution. We have these installed in our virtual lab. MET Virtual Labs (VLAB) provide students with all required software. Most of the examples presented in class will be run in this environment. You can familiarize yourself with the virtual labs with the information from our website: <http://www.bu.edu/metit/services/#vlab-target>

Additional Resources:

There are many online resources available. This is a partial list:

1. <http://www.pythontutor.com/visualize.html> - this website is very useful and allows to run simple Python programs and visualize the execution. Many of the illustrations in the course notes were generated using this website.
2. <https://docs.python.org/2/tutorial> - an official Python tutorial
3. <https://www.tutorialspoint.com/python> - a detailed tutorial with many simple examples
4. <https://www.learnpython.org> - free, interactive tutorial
5. <https://www.python.org/community/sigs/current/edu-sig/> - contains links to learning resources, including two free books

Grading Information

Please check the **Study Guide** in the syllabus for Live Classroom dates and specific due dates for assignments and assessments.

Teaching Approach and Goals

I am a strong believer in learning by using many illustrated examples. These examples will help us build the fundamental understanding of Python and how to use it to solve real problems. Many exercises presented in the course will help you develop skills that are needed to use Python effectively in your workplace and more advanced courses.

Homework, Grading, and Exams

Overall Grading Percentages	
Quizzes	15%
Homework Assignments	35%
Project	20%
Final Exam	30%

1. Quizzes

There are six 30-minute quizzes (one for each Module). All exams are multiple choice. Quizzes are closed book and will consist of typical Python questions that one can expect at a job interview.

2. Homework Assignments

This is a programming class and it is essential that students have practice. Most homework assignments will consist of programming problems from the textbook.

3. Project

The project is open ended and the topics can be chosen by students. In this project, students will frame and solve problems using quantitative capabilities of Python. Students will present their projects in the final week of the course.

4. Final Exam

There will be a proctored Final Exam in this course using an online proctoring service that you will access via your course in Blackboard. Detailed instructions regarding your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your own appointment.

The exam will be closed book and will take two hours. The exam will consist of typical Python questions that one can expect at a job interview.

Homework Assignment Evaluation Criteria

The evaluation criteria for assignments are shown below--otherwise, stated with the assignment.

Letter Grade	Approximate Percentage Grade Range	When To Give
A	95-100	The student's submission is excellent and without defect. The submission demonstrates mastery of the material.
A-	90-94.9	The student's submission is excellent with some minor defects. The submission demonstrates a solid grasp of the material.
B+	85-89.9	The student's submission is good with a few defects. The submission demonstrates a solid grasp of most but not all of the material.
B	80-84.9	The student's submission is above average with some defects. The submission demonstrates a solid grasp of some aspects of the material.
B-	75-79.9	The student's submission is approaching average. The submission demonstrates a grasp and understanding of some aspects of the material.
C+	70-74.9	The student's submission is average and has some moderate defects. The submission demonstrates a minimal grasp and understanding of the material.
C	65-69.9	The student's submission is average and has some major defects. The submission demonstrates a basic understanding of the material but nothing more.
C-	60-64.9	The student's submission is below average and has some major defects. The submission demonstrates a barebones understanding of the material but nothing more.
D	50-59.9	The student's submission is poor. Sections may be missing from the submission. The submission does not demonstrate an understanding of the material at even a basic level.
F	0-49.9	The student's submission is unacceptable. Sections may be missing from the submission.

		The submission does not demonstrate an understanding of the material in any fashion.
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Study Guide

This course starts on a **Tuesday**. The modules in this course run from **Tuesday to Monday**.

The following material is collected here for your convenience. The study guides can also be accessed at the beginning of each weekly lecture.

Module 1 Study Guide and Deliverables

March 10–16

Activity	Item
Theme	Introduction to Computing with Python
Readings	<ul style="list-style-type: none"> Chapter 1 (sections 1.1–1.5), Chapter 9 (section 9.6), and Appendix A Module Lecture Notes
Topics	Introduction to Computing, Program Structure, Running Python, Input/Output, Variable Scopes and Modules
Assignments	Assignment 1 due on Tuesday, March 17 at 6:00 pm ET
Assessments	Quiz 1: <ul style="list-style-type: none"> Available Friday, March 13 at 6:00 am ET Due on Tuesday, March 17 at 6:00 pm ET
Live Classrooms	<ul style="list-style-type: none"> Tuesday, March 10 from 6:00-7:30 pm ET Saturday, March 14 from noon-1:30 pm ET Facilitator Session: to be determined

Module 2 Study Guide and Deliverables

March 17–23

Activity	Item
Theme	Basic Building Blocks for Python Programs
Readings	<ul style="list-style-type: none"> Chapter 1 (sections 1.6–1.9), Chapter 2 (sections 2.2.1–2.2.7), and Chapter 16 (section 16.1) Module Lecture Notes
Topics	Data Types, Hashing, Mutability, Python Ranges, Copying Objects
Assignments	Assignment 2 due on Tuesday, March 24 at 6:00 pm ET
Assessments	Quiz 2: <ul style="list-style-type: none"> Available Friday, March 20 at 6:00 am ET Due on Tuesday, March 24 at 6:00 pm ET
Live Classrooms	<ul style="list-style-type: none"> Tuesday, March 17 from 6:00-7:30 pm ET Saturday, March 21 from noon-1:30 pm ET Facilitator Session: to be determined

Module 3 Study Guide and Deliverables

March 24–30

Activity	Item
Theme	Building Python Projects
Readings	<ul style="list-style-type: none">Chapter 2 (sections 2.2.8–2.2.14), Chapter 4, Chapter 6 (sections 6.1–6.5), Chapter 14 (sections 14.1–14.3)Module Lecture Notes
Topics	Strings, Collections, Control Flow, Iterations, Files, Lists
Assignments	<ul style="list-style-type: none">Assignment 3 due on Tuesday, March 31 at 6:00 pm ETFinal Project Topic due on Wednesday, April 1 at 6:00 pm ET
Assessments	Quiz 3: <ul style="list-style-type: none">Available Friday, March 27 at 6:00 am ETDue on Tuesday, March 31 at 6:00 pm ET
Live Classrooms	<ul style="list-style-type: none">Tuesday, March 24 from 6:00-7:30 pm ETSaturday, March 28 from noon-1:30 pm ETFacilitator Session: To be determined

Module 4 Study Guide and Deliverables

March 31–April 6

Activity	Item
Theme	Collections in Detail
Readings	<ul style="list-style-type: none">Chapter 7 and Chapter 9Module Lecture Notes
Topics	Sets, Tuples, Dictionaries, Stacks, Queues, Singly Linked Lists, Doubly Linked Lists, Sorting, Searching
Assignments	Assignment 4 due on Tuesday, April 7 at 6:00 pm ET
Assessments	Quiz 4: <ul style="list-style-type: none">Available Friday, April 3 at 6:00 am ETDue on Tuesday, April 7 at 6:00 pm ET
Live Classrooms	<ul style="list-style-type: none">Tuesday, March 31 from 6:00-7:30 pm ETSaturday, April 4 from noon-1:30 pm ETFacilitator Session: To be determined

Module 5 Study Guide and Deliverables

April 7–April 13

Activity	Item
Theme	Functions in Detail
Readings	<ul style="list-style-type: none">Chapter 6 (section 6.6), Chapter 14 (section 14.4), Chapter 5, Chapter 8, Chapter 15, and Chapter 16 (section 16.2)Module Lecture Notes

Topics	Exceptions, Introduction to Functions, Parameter Passing, Generators, Recursive Functions, Functional Programming
Assignments	Assignment 5 due on Tuesday, October 7 at 6:00 pm ET
Assessments	Quiz 5: <ul style="list-style-type: none"> • Available Friday, April 10 at 6:00 am ET • Due on Tuesday, April 14 at 6:00 pm ET
Live Classrooms	<ul style="list-style-type: none"> • Tuesday, April 7 from 6:60-7:30 pm ET • Saturday, April 11 from noon-1:30 pm ET • Facilitator Session: To be determined

Module 6 Study Guide and Deliverables

April 14–20

Activity	Item
Theme	Classes in Detail
Readings	<ul style="list-style-type: none"> • Chapters 11, 12, and 13 • Module Lecture Notes
Topics	Introduction to Classes, Assignment and Copy, Static vs. Instance Variables, Data Encapsulation, Overloading, Inheritance and Polymorphism, Multiple Inheritance and Abstract Classes
Assignments	Assignment 6 due on Tuesday, April 21 at 6:00 pm ET
Assessments	Quiz 6: <ul style="list-style-type: none"> • Available Friday, April 17 at 6:00 am ET • Due on Tuesday, April 21 at 6:00 pm ET
Live Classrooms	<ul style="list-style-type: none"> • Tuesday, April 14 from 6:00-7:30 pm ET • Saturday, April 18 from noon-1:30 pm ET • Facilitator Session: To be determined
Course Evaluation	Please complete the course evaluation once you receive an email or Blackboard notification indicating the evaluation is open. Your feedback is important to MET, as it helps us make improvements to the program and the course for future students.

Module 7 Study Guide and Deliverables

April 21–27

Activity	Item
Theme	Final exam and project presentations
Final Project and Video	Term Project due on Saturday, April 25 at 11:59 pm ET

Final Exam Details

The Final Exam is a proctored exam available from **Wednesday, April 22 at 6:00 AM ET to Saturday, April 25 at 11:59 PM ET**. The Computer Science department requires that all final exams be administered using an online proctoring service that you will access via your course in Blackboard. Additional information regarding your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your own appointment within the defined exam window.

The Final Exam will be **closed book/closed notes** and is accessible only during the final exam period. You can access it from the Assessments section of the course. Your proctor will enter the password to start the exam.

Final Exam duration: **two hours**

Academic Conduct Policy

Please visit Metropolitan College's website for the full text of the department's [Academic Conduct Code](#).

A Definition of Plagiarism

“The academic counterpart of the bank embezzler and of the manufacturer who mislabels products is the plagiarist: the student or scholar who leads readers to believe that what they are reading is the original work of the writer when it is not. If it could be assumed that the distinction between plagiarism and honest use of sources is perfectly clear in everyone’s mind, there would be no need for the explanation that follows; merely the warning with which this definition concludes would be enough. But it is apparent that sometimes people of goodwill draw the suspicion of guilt upon themselves (and, indeed, are guilty) simply because they are not aware of the illegitimacy of certain kinds of “borrowing” and of the procedures for correct identification of materials other than those gained through independent research and reflection.”

“The spectrum is a wide one. At one end there is a word-for-word copying of another’s writing without enclosing the copied passage in quotation marks and identifying it in a footnote, both of which are necessary. (This includes, of course, the copying of all or any part of another student’s paper.) It hardly seems possible that anyone of college age or more could do that without clear intent to deceive. At the other end there is the almost casual slipping in of a particularly apt term which one has come across in reading and which so aptly expresses one’s opinion that one is tempted to make it personal property.”

“Between these poles there are degrees and degrees, but they may be roughly placed in two groups. Close to outright and blatant deceit-but more the result, perhaps, of laziness than of bad intent-is the patching together of random jottings made in the course of reading, generally

without careful identification of their source, and then woven into the text, so that the result is a mosaic of other people's ideas and words, the writer's sole contribution being the cement to hold the pieces together. Indicative of more effort and, for that reason, somewhat closer to honest, though still dishonest, is the paraphrase, and abbreviated (and often skillfully prepared) restatement of someone else's analysis or conclusion, without acknowledgment that another person's text has been the basis for the recapitulation."

The paragraphs above are from H. Martin and R. Ohmann, *The Logic and Rhetoric of Exposition, Revised Edition*. Copyright 1963, Holt, Rinehart and Winston.

Academic Conduct Code

I. Philosophy of Discipline

The objective of Boston University in enforcing academic rules is to promote a community atmosphere in which learning can best take place. Such an atmosphere can be maintained only so long as every student believes that his or her academic competence is being judged fairly and that he or she will not be put at a disadvantage because of someone else's dishonesty. Penalties should be carefully determined so as to be no more and no less than required to maintain the desired atmosphere. In defining violations of this code, the intent is to protect the integrity of the educational process.

II. Academic Misconduct

Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments, or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own.

III. Violations of this Code

Violations of this code comprise attempts to be dishonest or deceptive in the performance of academic work in or out of the classroom, alterations of academic records, alterations of official data on paper or electronic resumes, or unauthorized collaboration with another student or students. Violations include, but are not limited to:

- A. **Cheating on examination.** Any attempt by a student to alter his or her performance on an examination in violation of that examination's stated or commonly understood ground rules.
- B. **Plagiarism.** Representing the work of another as one's own. Plagiarism includes but is not limited to the following: copying the answers of another student on an examination, copying or restating the work or ideas of another person or persons in any oral or written work (printed or electronic) without citing the

appropriate source, and collaborating with someone else in an academic endeavor without acknowledging his or her contribution. Plagiarism can consist of acts of commission-appropriating the words or ideas of another-or omission failing to acknowledge/document/credit the source or creator of words or ideas (see below for a detailed definition of plagiarism). It also includes colluding with someone else in an academic endeavor without acknowledging his or her contribution, using audio or video footage that comes from another source (including work done by another student) without permission and acknowledgement of that source.

- C. **Misrepresentation or falsification of data** presented for surveys, experiments, reports, etc., which includes but is not limited to: citing authors that do not exist; citing interviews that never took place, or field work that was not completed.
- D. **Theft of an examination.** Stealing or otherwise discovering and/or making known to others the contents of an examination that has not yet been administered.
- E. **Unauthorized communication during examinations.** Any unauthorized communication may be considered prima facie evidence of cheating.
- F. **Knowingly allowing another student to represent your work as his or her own.** This includes providing a copy of your paper or laboratory report to another student without the explicit permission of the instructor(s).
- G. **Forgery, alteration, or knowing misuse of graded examinations, quizzes, grade lists, or official records of documents,** including but not limited to transcripts from any institution, letters of recommendation, degree certificates, examinations, quizzes, or other work after submission.
- H. **Theft or destruction of examinations or papers** after submission.
- I. **Submitting the same work in more than one course** without the consent of instructors.
- J. **Altering or destroying another student's work or records,** altering records of any kind, removing materials from libraries or offices without consent, or in any way interfering with the work of others so as to impede their academic performance.
- K. **Violation of the rules governing teamwork.** Unless the instructor of a course otherwise specifically provides instructions to the contrary, the following rules apply to teamwork: 1. No team member shall intentionally restrict or inhibit another team member's access to team meetings, team work-in-progress, or other team activities without the express authorization of the instructor. 2. All team members shall be held responsible for the content of all teamwork submitted for evaluation as if each team member had individually submitted the entire work product of their team as their own work.
- L. **Failure to sit in a specifically assigned seat during examinations.**
- M. **Conduct in a professional field assignment that violates the policies and regulations of the host school or agency.**

- N. **Conduct in violation of public law occurring outside the University that directly affects the academic and professional status of the student, after civil authorities have imposed sanctions.**
- O. **Attempting improperly to influence the award of any credit, grade, or honor.**
- P. **Intentionally making false statements to the Academic Conduct Committee or intentionally presenting false information to the Committee.**
- Q. **Failure to comply with the sanctions imposed under the authority of this code.**

Important Message on Final Exams

Dear Boston University Computer Science Online Student,

As part of our ongoing efforts to maintain the high academic standard of all Boston University programs, including our online MSCIS degree program, the Computer Science Department at Boston University's Metropolitan College requires that each of the online courses includes a proctored final examination.

By requiring proctored finals, we are ensuring the excellence and fairness of our program. The final exam is administered online.

Specific information regarding final-exam scheduling will be provided approximately two weeks into the course. This early notification is being given so that you will have enough time to plan for where you will take the final exam.

I know that you recognize the value of your Boston University degree and that you will support the efforts of the University to maintain the highest standards in our online degree program.

Thank you very much for your support with this important issue.

Regards,

Professor Lou Chitkushev, Ph.D.
Associate Dean for Academic Affairs
Boston University Metropolitan College

Who's Who: Roles and Responsibilities

You will meet many BU people in this course and program. Some of these people you will meet online, and some you will communicate with by email and telephone. There are many people behind the scenes, too, including instructional designers, faculty who assist with course preparation, and video and animation specialists.

People in Your Online Course in Addition to Your Fellow Students

Your Facilitator. Our classes are divided into small groups, and each group has its own facilitator. We carefully select and train our facilitators for their expertise in the subject matter and their excellence in teaching. Your facilitator is responsible for stimulating discussions in pedagogically useful areas, for answering your questions, and for grading homework assignments, discussions, term projects, and any manually graded quiz or final-exam questions. If you ask your facilitator a question by email, you should get a response within 24 hours, and usually faster. If you need a question answered urgently, post your question to one of the urgent help topics, where everyone can see it and answer it.

Your Professor. The professor for your course has primary responsibility for the course. If you have any questions that your facilitator doesn't answer quickly and to your satisfaction, then send your professor an email in the course, with a cc to your facilitator so that your facilitator is aware of your question and your professor's response.

Your Lead Faculty and Student Support Administrator, Jennifer Sullivan. Jen is here to ensure you have a positive online experience. You will receive emails and announcements from Jen throughout the semester. Jen represents Boston University's university services and works for BU Virtual. She prepares students for milestones such as course launch, final exams, and course evaluations. She is a resource to both students and faculty. For example, Jen can direct your university questions and concerns to the appropriate party. She also handles general questions regarding Online Campus functionality for students, faculty, and facilitators, but she does not provide tech support. She is enrolled in all classes and can be contacted within the course through Online Campus email as it is running. You can also contact her by external email at jensul@bu.edu

People Not in Your Online Course

Although you will not normally encounter the following people in your online course, they are central to the program. You may receive emails or phone calls from them, and you should feel free to contact them.

Your Computer Science Department Online Program Coordinator, Michelle Younger. Michelle administers the academic aspects of the program, including admissions and registration. You can ask her questions about the program, registration, course offerings, graduation, or any other program-related topic. She can be reached at metcsol@bu.edu or (617) 353-2566.

Professor Guanglan Zhang, Computer Science Department Chairman. You can reach Professor Zhang at guanglan@bu.edu or at 617-358-5688.

Professor Lou T. Chitkushev, Associate Dean for Academic Affairs, Metropolitan College. Dr. Chitkushev is responsible for the academic programs of Metropolitan College. Contact Professor Chitkushev with any issues that you feel have not been addressed adequately. The

customary issue-escalation sequence after your course facilitator and course faculty is Professor Zhang, and then Professor Chitkushev.

Professor Tanya Zlateva, Metropolitan College Dean. Dr. Zlateva is responsible for the quality of all the academic programs at Boston University Metropolitan College.