Syllabus

This is a single, concatenated file, suitable for printing or saving as a PDF for offline viewing. Please note that some animations or images may not work.

Description

This module is also available as a concatenated page, suitable for printing or saving as a PDF for offline viewing.

MET CS 521
Information Structures with Python

This course covers the concepts of the object-oriented approach to software design and development using the Python programming language. It includes a detailed discussion of programming concepts starting with the fundamentals of data types, control structures methods, classes, arrays and strings, and proceeding to advanced topics such as inheritance and polymorphism, creating user interfaces, exceptions and streams. Upon completion of this course students will be capable of applying software engineering principles to design and implement Python applications that can be used in conjunction with analytics and big data.

Technical Note

The table of contents expands and contracts (+/- sign) and may conceal some pages. To avoid missing content pages, you are advised to use the next/previous page icons in the top right corner of the learning modules.

Learning Objectives

By successfully completing this course you will be able to:

- Readily use the Python programming language
- Organize and modularize programs
- Understand and apply object-oriented program design and development
- Apply various data types and control structures
- Use class inheritance and polymorphism
- Create user interfaces
- Deal with exceptions
- Integrate web access into applications
- Understand and begin to implement secure, robust, and scalable code

Instructor

George Ultrino

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George Ultrino studied Computer Information Systems Security at Boston University, and has been facilitating and teaching at BU since 2010. He also holds a CISSP verification. He has taught graduate courses in Database Security and facilitated CS521 and CS625. His experience includes quality engineering, radar, telecommunications, networking, security and programming. His current research interests include network and data security.

Original Course Developer

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Eric Braude received his Ph.D. from Columbia University in mathematics and Master's in Computer Science from the University of Miami. He taught at CUNY and Penn State, followed by twelve years in government and industry as a software engineer, scientist, and manager. He is an Associate Professor of Computer Science at Boston University's Metropolitan College where he has at times held the chairmanship and the acting associate deanship. His research concerns reliable program construction. Eric has written, co-written, or edited six books, including "Software Engineering" and "Software Design." His most recent papers appeared in *Science of Programming* in 2014 and at the *Learning@Scale* 2015 conference.

(For a complete resume, see http://www.bu.edu/csmet/files/2014/07/Professor-Eric-Braude_Resume.pdf.)

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 test will be used in conjunction with the online course modules and online Python documentation.

Summerfield, M. (2009). ***Programming in Python 3: A Complete Introduction to the Python Language*** **(2nd ed.).**
Addison-Wesley Professional.

ISBN-13: 978-0321680563
ISBN-10: 0321680561

This book can be purchased from Barnes and Noble at Boston University.

Recommended Book

Zelle, J. M. (2010). ***Python programming: An introduction to computer science*** **(2nd ed.).**
Wilsonville, OR: Franklin, Beedle & Associates.

ISBN-13: 978-1590282410
ISBN-10: 1590282418

This book can be purchased from Barnes and Noble at Boston University.

Boston University Library Information

Boston University has created a set of videos to help orient you to the online resources at your disposal. An introduction to the series is below:

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Download

All of the videos in the series are available on the Online Library Resources page, which is also accessible from the Campus Bookmarks section of your Online Campus Dashboard. Please feel free to make use of them.

As Boston University students, you have full access to the BU Library. From any computer, you can gain access to anything at the library that is electronically formatted. To connect to the library, use the link http://www.bu.edu/library. You may use the library's content whether you are connected through your online course or not, by confirming your status as a BU community member using your Kerberos password.

Once in the library system, you can use the links under “Resources” and “Collections” to find databases, eJournals, and eBooks, as well as search the library by subject. Some other useful links follow:

Go to http://www.bu.edu/library/research/collections to access eBooks and eJournals directly.

If you have questions about library resources, go to http://www.bu.edu/library/help/ask-a-librarian to email the library or use the live-chat feature.

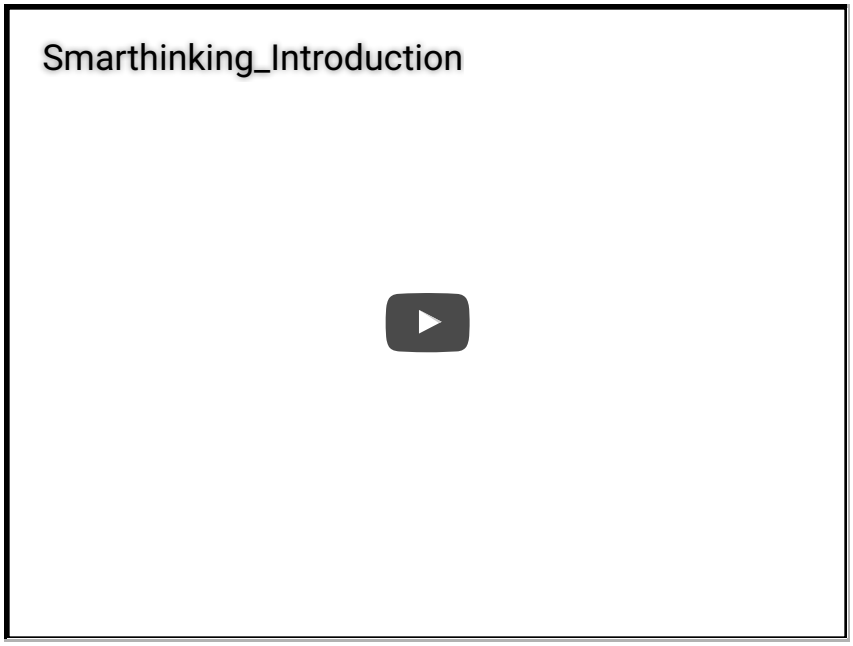
To locate course eReserves, go to http://www.bu.edu/library/services/reserves.

Please note that you are not to post attachments of the required or other readings in the water cooler or other areas of the course, as it is an infringement on copyright laws and department policy. All students have access to the library system and will need to develop research skills that include how to find articles through library systems and databases.

Free Tutoring Service

Free online tutoring with SMARTHINKING is available to BU online students for the duration of their courses. The tutors do not rewrite assignments, but instead teach students how to improve their skills in the following areas: writing, math, sciences, business, ESL, and Word/Excel/PowerPoint.

You can log in directly to SMARTHINKING from Online Campus by using the link in the left-hand navigation menu of your course.



YouTube

Please Note

The SMARTHINKING service can be used for Boston University online class work only. Use of this service for personal purposes or for anything other than Boston University online class work will result in deactivation of your SMARTHINKING account.

Grading Information

The grade for the course is determined by the following:

Overall Grading Percentages	
Assignments 1-4	15%
Labs 1-5	10%
Project 1-3	45%
Final Exam	30%

Due dates are listed in the study guide of the syllabus. If a lab or assignment is late, it may not count for credit (this may be considered after the final exams). If there is a compelling reason why the assignment could not be submitted on time, this reason should be given in advance (when possible, of course) and the assignment will be graded on a pass/fail basis.

Each lab will be weighted equally. The possible grades are 1, meaning that you have clearly grasped the relevant concepts, 0 meaning that you have not, and 0.5 meaning that neither is clear.

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	65-59.9	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	50-60	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.

Assignments

Homework assignments are focused on applying theory learned in the week's module by writing Python programs. Assignment submissions should be a single .py file of your Python code.

Labs

Labs are designed to be significant steps towards creating your own programs. The labs are designed to reinforce the skills and topics needed for that week's assignments. The labs are used to measure your understanding of the material, so explaining your solution can go a long way.

Project

There will be a cumulative project that will demonstrate your python skill level and understanding of all of the topics covered in the course. The project will be given in three iterations and each will build on the previous assignment. All three iterations will be available at the beginning of week 4.

Proctored Final Exam

The final exam will cover concepts from modules 1–6.

Expectations

Due dates will be indicated for each lab and assignment in the assignments section of the course and in the Study Guide. If, for any reason, you are unable to meet any assignment deadline, contact your facilitator. All times mentioned in the course (unless otherwise specified) are in Eastern Time. All assignments (and labs) must be completed and must be turned in by their due dates and due times. Extensions may be granted, though only under mitigating circumstances. If prior approval for late submission is not granted, 10 points will be deducted from the grade up to 48 hours. After 48 hours, a grade of 0 will be assessed. No credit can be given for assignments submitted after solutions are reviewed.

Study Guide

Module 1 Study Guide and Deliverables

Readings:	• Online lectures • **Summerfield** – Chapters 2 and Chapter 3; Chapter 4 – Control Structures
Discussions:	Optional Discussion 1 postings end January 24 at 5:00 AM ET

Labs: Lab 1 due Saturday, January 21 at 5:00 AM ET

Assignments: Assignment 1 due Tuesday, January 24 at 5:00 AM ET

Live Classrooms: Thursday, January 19 from 8:00-9:30 PM ET
Sunday, January 22 from 8:00-9:30 PM ET

Module 2 Study Guide and Deliverables

Readings:
- Online lectures
- **Summerfield** – Chapter 4 – Custom Functions; Chapter 5 and Chapter 7
- Online notes and references cited there

Discussions: Optional Discussion 2 postings end January 31 at 5:00 AM ET

Labs: Lab 2 due Saturday, January 28 at 5:00 AM ET

Assignments: Assignment 2 due Tuesday, January 31 at 5:00 AM ET

Live Classrooms: Thursday, January 26 from 8:00-9:30 PM ET
Sunday, January 29 from 8:00-9:30 PM ET

Module 3 Study Guide and Deliverables

Readings:
- Online lectures
- **Summerfield** – Chapter 6

Discussions: Optional Discussion 3 postings end February 7 at 5:00 AM ET

Labs: Lab 3 due Saturday, February 4 at 5:00 AM ET

Assignments: Assignment 3 due Tuesday, February 7 at 5:00 AM ET

Live Classrooms: Thursday, February 2 from 8:00-9:30 PM ET
Sunday, February 5 from 8:00-9:30 PM ET

Module 4 Study Guide and Deliverables

Readings:
- Online lectures
- **Summerfield** – Chapter 4 Exception Handling; Chapter 15
- References cited in notes

Discussions: Optional Discussion 4 postings end February 14 at 5:00 AM ET

Labs: Lab 4 due Saturday, February 28 at 5:00 AM ET

Assignments: Project Part 1 due at the end of Module 6, Tuesday, February 14 at 5:00 AM ET

Live Classrooms: Thursday, February 9 from 8:00-9:30 PM ET
Sunday, February 12 from 8:00-9:30 PM ET

Module 5 Study Guide and Deliverables

Readings:
- Online lectures
- References cited in notes
- **Summerfield** – Chapter 3 – Mapping types Only; Chapter 12 – SQL Databases Only
- https://docs.python.org/3/tutorial/datastructures.html section 5.1.1 and 5.1.2

Discussions: Optional Discussion 5 postings end February 21 at 5:00 AM ET

Labs: none

Assignments: Project Part 2 due at the end of Module 6, Tuesday, February 28 at 5:00 AM ET

Live Classrooms: Thursday, February 16 from 8:00-9:30 PM ET
Sunday, February 19 from 8:00-9:30 PM ET

Module 6 Study Guide and Deliverables

Readings:
- Online lectures
- References cited in notes
- https://docs.python.org/2/tutorial/stdlib2.html#multi-threading
- **Summerfield** – Chapter 10

Discussions: Optional Discussion 6 postings end February 28 at 5:00 AM ET

Labs: none

Assignments: Project Part 3 due at the end of Module 6, Tuesday, February 28 at 5:00 AM ET

Live Classrooms: Thursday, February 23 from 8:00-9:30 PM ET
Sunday, February 26 from 8:00-9:30 PM ET

Important: Final Exam

You will be responsible for setting up your own appointment with an approved proctoring option. This exam will be three hours in length and will cover material from the entire course. Further information about the testing centers will be forthcoming from the exam coordinator.

Final Exam Details

The Final Exam is a proctored exam available from **Wednesday, March 1 at 6:00 AM ET to Saturday, March 4 at 11:59 PM ET**. The Computer Science department requires that all final exams be proctored.

The exam is a three-hour closed-book exam consisting of multiple choice questions, multiple answers question, and essay question. It will only be accessible 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.

You will receive a technical support hotline number before the start of the exam. Please bring this number with you to the exam.