

CMPSC 102 – Discrete Structures

Fall 2022

Syllabus updated: July 31, 2022

Course Instructor

Dr. Oliver BONHAM-CARTER (said and written as “Bonham-Carter,” not “Carter”)

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Exam Code: F

Final deliverable 16th Dec 2019, 7:00 pm Distribution Requirements: *QR* and *SP*

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Instructor's Office Hours

To schedule a meeting with me during my office hours, please visit my Web site and click the “Schedule” link in the top right-hand corner. Now, you can view my calendar or by clicking “schedule an appointment” link browse my office hours and schedule an appointment by clicking the correct link to reserve an open time slot.

Course Meeting Schedule

- Lecture, Discussion, Presentations and Group Work:
Monday, Wednesday, Friday 1:30pm – 2:20 pm
- Laboratory Session:
Tuesday, 2:30 pm – 4:20 pm

Academic Bulletin Description

Four Credits: An introduction to the foundations of computer science with an emphasis on understanding the abstract structures used to represent discrete objects. Participating in hands-on activities that often require teamwork, students learn the computational methods and logical principles that

they need to create and manipulate discrete objects in a programming environment. Students also learn how to write, organize, and document a program's source code so that it is easily accessible to intended users of varied backgrounds. During a weekly laboratory session students use state-of-the-art technology to complete projects, reporting on their results through both written documents and oral presentations. Prerequisite: Knowledge of elementary algebra. Distribution Requirements: QR, SP.

Course Objectives

The expectation of this course is to allow the student to gain skill to formulate what a computer system is supposed to do, determine whether a solution is possible by meeting the specification and parameters of the problem at hand. Since programming Python for solutions is to be considered in light of its level of efficiency, this class focuses on the solution's mathematical approach, its precision of mathematical notation, and its associated calculation and programming techniques which are necessary to obtain working solutions. For instance, in order to find programmed solutions to problems, it is necessary to define the problem precisely by abstracting all details leading to the solution and then one must proceed mathematically using objects such as sets, functions, relations, orders, and sequences. In this class, skills for applying these concepts, as well as their foundations, are provided to help students derive strategies for finding solutions via Python programming.

Required Textbooks

- *Programming and Mathematical Thinking - A Gentle Introduction to Discrete Math Featuring Python* by Allan M. Staveland; ISBN paperback 978-1-938159-00-8 and ISBN ebook: 978-1-938159-01-5
- *Doing Math with Python* by Amit Saha; ISBN paperback: 1-59327-640-0

Students who want to improve their writing and programming skills may consult the following books.

- *Think Python, first edition*, by Allen B. Downey.
 - Textbook: <http://greenteapress.com/thinkpython/thinkpython.pdf>
 - Publisher: <http://greenteapress.com/wp/think-python/>
- *BUGS in Writing: A Guide to Debugging Your Prose*. Lyn Dupré. Second Edition, ISBN-10: 020137921X, ISBN-13: 978-0201379211, 704 pages, 1998.
- *Writing for Computer Science*. Justin Zobel. Second Edition, ISBN-10: 1852338024, ISBN-13: 978-1852338022, 270 pages, 2004.

- Along with reading the required books, you will be asked to study many additional articles from a wide variety of conference proceedings, journals, and the popular press.

Class Policies

Grading

The grade that a student receives in this class will be based on the following categories. All percentages are approximate and, if the need to do so presents itself, it is possible for the assigned percentages to change during the academic semester.

Class Participation	15%
First Quiz	5%
Second Quiz	5%
First Examination	15%
Second Examination	15%
Laboratory Assignments	30%
Final Project	15%

These grading categories have the following definitions:

- *Class Participation*: All students are required to actively participate during all of the class sessions. Your participation will take forms such as answering questions about the required reading assignments, completing in-class exercises, asking constructive questions of the other members of the class, giving presentations, and leading a discussion session in class.
- *First and Second Quizzes*: The quizzes are designed to permit the student to know whether she or he is ready for the exam. Although the exams will contain new material, the quizzes will contain some of the concepts which the student may expect to see on the exam. Poor scores on quizzes will alert the student to approach the subject material with more focus.
- *First and Second Examinations*: The first and second examinations will cover all of the material in their associated module(s). While the second examination is not cumulative, it will assume that a student has a basic understanding of the material that was the focus of the first examination. The date for the first and second examinations will be announced at least one week in advance of the scheduled date. Unless prior arrangements are made with the course instructor, all students will be expected to take these examinations on the scheduled date and complete the tests in the stated period of time.
- *Laboratory Assignments*: These assignments invite students to explore the concepts, tools, and techniques associated with the management of data. All of the laboratory assignments require the use of the provided tools to design, implement,

and evaluate systems that solve data management problems. To ensure that students are ready to develop software in both other classes at Allegheny College and after graduation, the instructor will assign individuals to teams for some of the laboratory assignments. Unless specified otherwise, each laboratory assignment will be due at the beginning of the next laboratory session. Some of the laboratory assignments in this course will expect students to give both a short presentation and a demonstration of the software that they created to manage a collection of data.

- *Final Project:* This project will present you with the description of a problem and ask you to implement a full-featured solution using one or more programming languages and a wide variety of data management techniques. The final project in this class will require you to apply all of the knowledge and skills that you have accumulated during the course of the semester to solve a problem and, whenever possible, make your solution publicly available as a free and open-source tool. The project will invite you to draw upon both your problem solving skills and your knowledge of programming languages and data management systems.

Assignment Submission

All assignments will have a stated due date. **The electronic version of the class assignments are to be turned in at the beginning of the lab session on that due date. Submissions after the beginning of class are counted as being late.** Assignments will be accepted for up to one week past the assigned due date with a 15% penalty. All late assignments must be submitted at the beginning of the session that is scheduled one week after the due date. The honor code (see below) is assumed for all submitted work.

Extensions

Unless special arrangements are made with the course instructor, no assignments will be accepted after the late deadline. If you are requesting extensions for a lab assignment, then you are to email me with your request and also provide a *valid reason* for your extension. **This request must come *before* the due date of the lab and not on the due date.**

Requests will not be granted where the reason appears to be insignificant. Extensions are 24 hours of extra time (after the original due date) and are given out at my discretion. The decision to provide you with an extension (or not) will be weighed in light of fairness to your peers who are still able to complete their labs, regardless of their own busy schedules.

Attendance

It is mandatory for all students to attend the class and laboratory sessions. If you will not be able to attend a session, then please see/email the course instructor at least one week in advance to describe your situation. Students who miss more than five

unexcused classes, laboratory sessions, or group project meetings will have their final grade in the course reduced by one letter grade. Students who miss more than ten of the aforementioned events will automatically fail the course.

Use of Laboratory Facilities

To ensure that your software development experience in this course closely mirrors real-world practice, you are invited to use your own laptop during class and laboratory sessions. The course instructor and the department's systems administrator have invested a considerable amount of time to develop a container-based approach to support the completion of all of the assignments and projects on any laptop that satisfies minimal requirements. The department has a limited number of (Linux OS) laptops that students may be allowed to borrow for the course. These machines are available on a case-by-case basis; please see Instructor for details.

Class Preparation

In order to minimize confusion and maximize learning, students must invest time to prepare for class discussions and lectures. During the class periods, the course instructor will often pose demanding questions that could require group discussion, the creation of a program or test suite, a vote on a thought-provoking issue, or a group presentation. Only students who have prepared for class by reading the assigned material and reviewing the current assignments will be able to effectively participate in these discussions. More importantly, only prepared students will be able to acquire the knowledge and skills that are needed to be successful in both this course and the field of data management. In order to help students remain organized and effectively prepare for classes, the course instructor will maintain a class schedule with reading assignments and presentation slides. During the class sessions students will also be required to access, download, use, and modify programs, and work with data sets that are made available through the course *Github Classroom* repository.

Email and Discord

Using your Allegheny College email address and your Discord (url: <https://discord.com/download>) account, I will sometimes send out class announcements about matters such as assignment clarifications or changes in the schedule. It is your responsibility to check your email and Discord accounts at least once a day and to ensure that you can reliably send and receive messages. This class policy is based on the following statement in *The Compass*, the college's student handbook.

“The use of email is a primary method of communication on campus. . . . All students are provided with a campus email account and address while enrolled at Allegheny and are expected to check the account on a regular basis.”

Disability Services

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. Students with disabilities who believe they may need accommodations in this class are encouraged to contact Disability Services at 332-2898. Disability Services is part of the Learning Commons and is located in Pelletier Library. Please do this as soon as possible to ensure that approved accommodations are implemented in a timely fashion.

Honor Code

The Academic Honor Program that governs the entire academic program at Allegheny College is described in the Allegheny Course Catalogue. The Honor Program applies to all work that is submitted for academic credit or to meet non-credit requirements for graduation at Allegheny College. This includes all work assigned for this class (e.g., examinations, laboratory assignments, and the final project). All students who have enrolled in the College will work under the Honor Program. Each student who has matriculated at the College has acknowledged the following pledge:

I hereby recognize and pledge to fulfill my responsibilities, as defined in the Honor Code, and to maintain the integrity of both myself and the College community as a whole.

Additionally, we expect that you will adhere to the following Department Policy:

Department of Computer Science Honor Code Policy

It is recognized that an important part of the learning process in any course, and particularly in computer science, derives from thoughtful discussions with teachers, student assistants, and fellow students. Such dialogue is encouraged. However, it is necessary to distinguish carefully between the student who discusses the principles underlying a problem with others, and the student who produces assignments that are identical to, or merely variations on, someone else's work. It will therefore be understood that all assignments submitted to faculty of the Department of Computer Science are to be the original work of the student submitting the assignment, and should be signed in accordance with the provisions of the Honor Code. Appropriate action will be taken when assignments give evidence that they were derived from the work of others.