

**CMPSC 112 – Introduction to Computer Science II**  
Course Syllabus Fall 2017  
Allegheny College

Course Instructor:

Dr. Aravind Mohan

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Instructors Office Hours

- Monday, Wednesday, and Friday: 9:30 am –11:00 am (15 minute time slots)
- Tuesday: 11:00 am –12:00 noon (15 minute time slots)
- Thursday: 11:00 am –11:30 am (15 minute time slots)

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 browse my office hours or schedule an appointment by clicking the correct link and then reserving an open time slot. Students are also encouraged to post appropriate questions to a channel in Slack, which is available at <https://CMPSC112f2017.slack.com/>, and monitored by the instructor and the teaching assistants.

Course Meeting Schedule

Lecture: Tuesday and Thursday, 9:30 am –10:45 am

Lab: Thursday, 1:30 pm –3:20 pm

Final Exam: Thursday, December 14, 2017 at 7:00 pm

Course Description

A continuation of CMPSC 111 with an emphasis on data structures, data abstraction, algorithm design, the analytical and experimental evaluation of algorithm performance, and object-oriented design and implementation techniques. Topics include stacks, queues, deques, lists, strings, trees and graphs, dictionaries, recursion, searching and sorting algorithms, and an introduction to program verification. One laboratory per week.

**Prerequisites:** Computer Science 111, or permission of instructor.

**Distribution Requirements:** QR, SP

Required Texts and Materials

- Required Text: Data Structures & Algorithms in Java, Michael T. Goodrich and Roberto Tamassia, 6th Edition (ISBN13: 978-1-118-77133-4)
- Course Website: <http://cs.allegheny.edu/amohan/teaching/CMPSC112/index.html>
- Slack Channel: <http://cmpsc112f2017.slack.com>
- BitBucket Repository: [cmpsc112f2017-share](https://bitbucket.org/cmpsc112f2017/share)

Learning Objectives

1. Understand the notion of object-oriented code, both its structure and the design patterns used.
2. Explore the implementation of a number of data structures, including Stacks, Queues, Strings, Trees, Graphs, and Hashtables. Understand the uses of each of these structures as they relate to algorithm design, and analyze the performance of each data structure.
3. Gain exposure to fundamental code structures, such as recursion, searching, and sorting.

Teaching and Learning Methods

The main mode of learning in this class is following along with the posted course material and reading the accompanying sections in each textbook. Students are responsible for reading assigned portions of the textbook,

whether or not the topics are discussed in the lectures. Audio lectures provide explanation and emphasis for material and examples in the textbook. The instructor will ask questions to stimulate thinking and participation. Students comments and questions are highly encouraged via the course Slack channel. Internet resources will also be used to supplement lectures and discussions. The Lecture Structure and Lab Session Structure sections present in more detail the expectations and deliverables expected in each class session.

Students are responsible for attending each lecture and lab session when scheduled (see the Attendance Policy for further details). Course content will be delivered via BitBucket, and assignments should also be submitted to BitBucket (with the exception of paper exams).

### Lecture Structure

Lectures will consist of two primary formats: standard lectures and Q&A lectures.

- Standard Lectures: A standard lecture session will have the following format:
  - o A 5-minute Mastery Quiz, with questions reviewing the material from the previous lecture, only graded for Attendance credit.
  - o 40 minutes of lecture content, which will include multiple segments of (1) listening to lectures, (2) exploring and enhancing provided code, (3) attempting practice problems, and/or (4) interacting with non-code sample material.
  - o A 5-minute Review Form, to help me understand how you have followed the course material for the current session and if any of the content was unclear.
- Q&A Lectures: A Q&A lecture session will have the following format:
  - o A 5-minute Mastery Quiz, as above.
  - o A dedicated class session to answering questions that have been submitted in advance of the scheduled lecture.
  - o A 5-minute Review Form, to see if there are any followup questions, or if any of the additional explanations were unclear.

### Lab Session Structure

A laboratory session will include the following components:

- A 10-minute Weekly Quiz, with questions reviewing the material from the previous week of lectures, graded for Weekly Quizzes credit.
- A 100-minute in-depth exploration of some topic(s) from recent course material, due the following week and graded for Lab and Project credit. Exams will also be given during some lab sessions.

### Grading and Evaluation

Your total grade for the course will be based on the following, weighted appropriately:

- Exam 1 (15%)
- Exam 2 (15%)
- Final Exam (20%)
- Weekly Labs (20%)
- Weekly Quizzes (10%)
- Course Project (10%)
- Attendance (5%)
- Participation (5%)

A more detailed breakdown of the expectations for grades in the course is as follows:

- **Exams:** Three exams will be given in this class, spaced roughly five weeks apart. The final will be cumulative, as later parts of the course will build on your knowledge from previous weeks. Raw grades for the exams are based on the accuracy and merit of the content. In addition, the grades for the exams will be affected negatively if the quality of language use or the mechanics of the calculations undermine the overall logic and credibility of the content. Exams will be paper-based, not electronic.
- **Weekly Labs:** This course contains a weekly laboratory session, where students will investigate some of the topics that are noted in the textbooks and lecture in more detail. This investigation will take the form of solving

one or more coding challenges, answering one or more problems prompted by the textbook, and/or a guided walkthrough of a new concept. See the Assignment Submission and Late Policy section of this syllabus for details about the course Late Policy.

- **Weekly Quizzes:** During each weekly lab session, a short online quiz will be administered that serves to test your knowledge of some of the fundamental topics discussed in the lecture materials and in the textbooks.
- **Course Project:** This course contains a final project component for you to demonstrate what you have learned during the course of the semester. More details about the precise implementation requirements of the project will be released in March.
- **Attendance:** Students are expected to attend lecture and laboratory sessions in the classroom at the stated class time. Attendance will be determined by a short Mastery Quiz at the beginning of each course session, which will only be available during the scheduled class time. See the Attendance Policy section of this syllabus for details about grade reductions as a result of lack of attendance.
- **Participation:** Interaction with the professor and your classmates is important in any Allegheny course. Students will be expected to join discussions on the course Slack channel, attend office hours with the instructor, and providing feedback on the pace and content of the course to the instructor. Participation points may also be acquired by making contributions to group projects.

#### Assignment Submission and Late Policy

Every assignment has a due date and time. Failure to hand in the assignment by the deadline will result in a late submission penalty.

Assignments handed in within one week of the deadline will receive automatic grade reductions of 20% (in addition to any points deducted for errors). Assignments will not be accepted more than one week past the deadline, unless you can provide documented extenuating circumstances. Any extenuating circumstances must be documented through the Learning Commons, Counseling Center, Dean of Students office, Health Center, or other authoritative source.

If you are unable to attend class or lab for any reason beyond illness or injury, you must make arrangements with me to turn in assignments before class. Exams must be taken at scheduled times. This includes the final exam. Please check the syllabus and with the instructor one week before making any travel plans for the end of the semester or around breaks. Missed exams will receive a grade of zero without a documented illness or emergency.

#### Attendance Policy

It is mandatory for all students to attend all of the class and laboratory sessions. If you will not be able to attend a session, then please see 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.

#### Disability Statement

Students with disabilities who believe they may need accommodations in this class are encouraged to contact Student Disability Services (SDS) at (814) 332-2898. SDS is part of the Learning Commons and is located in Pelletier Library. Please do this as soon as possible to ensure that such accommodations are implemented in a timely fashion.

#### Email and Slack

The instructor will primarily be checking the course Slack channel and his allegheny email account on regular basis. In general, you could expect the instructor to reply to your email messages during:

- scheduled office hours
- morning time between 8.00 am –9.00 am
- afternoon time between 1.00 pm –2.00 pm

The instructor does not usually check his email and slack during weekends. Hence, plan it accordingly to send an email to the instructor during week days. Any changes to these times will be sent to the course Slack channel. Students who are struggling with the course material or who have question should begin by posting their question (unless a private concern) to the Slack channel, so that the instructor or a fellow student can provide an answer within the bounds of the Honor Code.

Class Preparation

In order to minimize confusion and maximize learning, students must invest time to prepare for the 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 data set, 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 computer science. 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 download, use, and modify programs and data sets that are made available through the course website.

Honor Code

All students enrolled at Allegheny College are bound by the Honor Code. It is expected that your behavior will reflect that commitment. To this end, 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.

You are encouraged to periodically review the specifics of the Honor Code as stated in the College Catalogue, The Compass, and elsewhere.

Additionally, the Honor Committee co-chairs have requested that a signature as well as the following phrasing be included on all submissions of graded work:

"This work is mine unless otherwise cited."

Structure of the Semester

This is a rough outline of the topics covered this semester. A detailed version will be updated at: <http://cs.allegheny.edu/amohan/teaching/CMPSC112/schedule.html> Some shifting in the schedule of topics is possible, but the exam dates are firm (probably).

**Course Structure**

Week 1 Quick 111 Review  
Weeks 2-3 OOP Design / UML  
Weeks 4-5 Arrays / Recursion  
Week 6 Analysis / Performance  
Weeks 7-8 Lists / Stacks / Queues  
Week 9 ArrayLists  
Week 10-11 Trees / Heaps / Graphs  
Weeks 12-13 Hashtables / Maps  
Weeks 14-15 Searching / Sorting

**(Approximate) Exam Dates**

Exam 1 October 3  
Exam 2 November 9  
Final Exam December 14, 2017 at 7:00 pm