CMPSC 202 – Algorithm Analysis
Course Syllabus Spring 2021
Allegheny College

Course Instructor:
Dr. Aravind Mohan
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Course Webpage: https://www.cs.allegheny.edu/sites/amohan/course.php?cid=MTM=

Instructors Office Hours

- Monday, Tuesday, Wednesday, and Thursday: 10:30 AM –12:00 PM (15 minute time slots)

To schedule a meeting with me during my office hours, please visit my web site and click the Schedule Meeting 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 monitored by the instructor. The Slack channel is available at:
`http://cs202spring21.slack.com/`

Course Meeting Schedule
Lecture: Monday and Wednesday, 9:20 am –10:20 am (remote)
Lab: Thursday, 2:50 PM –4:40 PM (remote)
Practical: Friday, 9:20 am –10:20 am (remote)

Academic Bulletin Course Description
A study of fundamental methods for designing and implementing algorithms and analyzing their efficiency. While developing expertise in select models of computation and the key mathematical and experimental approaches to studying algorithm efficiency, students investigate different types of algorithms through hands-on activities that often require teamwork. Students also learn how to determine whether a problem can be efficiently solved by an algorithm that is implemented as a computer program. 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.
Prerequisites: Computer Science 100 and 102
Distribution Requirements: QR, SP.

Required Texts and Materials
Algorithms (4th edition) by Robert Sedgewick and Kevin Wayne.
(ISBN13: 978-0-321-57351-3)
Some of the content for this class will also come directly from me.

Learning Objectives
Upon successful completion of this class, the student will be able to:

1. Implement and analyze algorithms for common tasks such as sorting, searching, and operations for common data structures.
2. Design techniques such as recursion, divide and conquer, and dynamic programming.
3. Understand how computational complexity is measured in terms of time and space; examine the classes P and NP and become familiar with the notion of NP-completeness.

Teaching and Learning Methods

The main mode of learning in this class is following along with the posted course material, completing lab work as instructed by the lab specifications, and reading the textbook and other accompanying materials provided by the instructor. Students are responsible for reading online resources as needed to expand on the topics that are discussed in the lectures. The instructor will ask questions to stimulate thinking and participation. Students comments and questions are highly encouraged during the class and via the course Slack channel.

Students are encouraged to form a team and interact with the instructor on brainstorming and developing new ideas for the technically sound final project. The key to success is to identify the project idea as early as possible. It is also possible to design the final project as a stepping stone to build collaborations with the instructor (for example independent research study, summer research project, and thesis work).

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 the course webpage, and assignments should also be submitted to the GitHub repository.

Grading and Evaluation

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

- Midterm Examination (10%)
- Final Examination (15%)
- Laboratory Assignments (25%)
- Skill Tests (10%)
- Course Project (20%)
- Practicals (10%)
- Class Participation (10%)

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

- **Exams:** Two exams will be given in this class, spaced roughly 7-8 weeks apart. The final examination 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 undermines the overall logic and credibility of the content.
- **Practical Assignments:** A practical assignment will be released to students during Friday class timings. These assignments allow students to enhance the technical skills that they learned in the previous class and intended to prepare for the challenges imposed in the laboratory sessions. The assignments will be graded based on a credit/no credit basis.
- **Weekly Labs:** This course contains a weekly laboratory session, where students will investigate some of the topics that are noted in the textbook 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.
- **Skill Tests:** There will be two or three skill tests administered that serves to test your knowledge on some of the fundamental topics discussed in the lecture materials and in the textbook. The questions can be either strictly multiple-choice or a combination of multiple-choice and descriptive questions. These tests are primarily intended to prepare the students well for the exam.
- **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.
- **Class Participation:** Students are expected to attend lectures, practicals, and laboratory sessions remotely at the stated class time. Interaction with the instructor 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 sources. 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 quizzes, tests, and final project presentations. Please check with the instructor one week before making any travel plans for the end of the semester or around breaks.

Attendance Policy
It is mandatory for all students to remotely attend/participate in 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.

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 a regular basis. In general, you could expect the instructor to reply to your email messages during:

- scheduled office hours
- morning time between 7.00 am –8.00 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 weekdays. Students who are struggling with the course material or who have a 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 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.

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 follow 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 elses 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.”