Course Information

Course Number & Title: CPSC3273 Algorithm I

Credits: 3

Description

This course introduces to algorithms as tools for fundamental computational problems solving. Using pseudocode, you will learn to read, trace, understand, and design algorithms. An algorithm must be correct, time-efficient, and space-efficient. You will learn in this a course how to analyze correctness and efficiency.

Course Objectives:

Upon completion of the course, you should be able to:

- read, trace, write, and understand algorithms
- to assess the correctness of an algorithm
- evaluate the time and space efficiency of an algorithm
- learn algorithm design/modify/reuse techniques
- learn further independently

Program Information

Program Educational Outcomes

The overall objective of the computer science program is to prepare graduates who will be successful in their chosen career paths. Within a few years of graduation, alumni of the computer science program will attain:

- **PEO 1**: Success in their chosen profession as evidenced by career satisfaction, promotions/raises, and leadership at levels appropriate to their experience.

and/or

- **PEO 2**: Success in post-undergraduate studies as evidenced by satisfaction with the decision to further their education, advanced degrees earned, and professional visibility (e.g., publications, presentations, awards, etc.).

Course Details

Required Books:

- Cormen, T., Leiserson, C., Rivest, R. and Stein, C. . *Introduction to Algorithms* (3rd ed.). The MIT Press.
  - (ISBN-13: 978-0262033848 or ISBN-10: 9780262033848)

Additional Readings

Articles pertinent to each week's topics may be posted for students on Canvas.

Course Structure

The course will follow this general pattern:

1. At the start of each module, students will get assigned readings
2. Students will watch a series of lectures on the topics covered in the module
3. Each lecture has graded *Self Study Questions* to assess and extend understanding.
4. A graded *review* closes the series of lectures,
5. Before the end of the module, students will complete and submit a *homework assignment* for a grade.
6. For some modules, students will complete and submit a *programming assignment* for a grade.

Outline of Course

This course will be broken up into seven modules. The following outline presents the topics to be covered in each module.

Module 1: Introduction to Algorithms
Module 2: Proof Techniques for Algorithms Correctness
Module 3: Growth of Functions
Module 4: Divide and Conquer Strategy
Module 5: Comparison-Based Sorting Algorithms
Module 6: Sorting in Linear Time
Module 7: Heap Applications (HeapSort and Priority Queues)

Grading Methodology

Achievement in this course will be assessed through completion of the following activities:

Assignment Type	Grade %
Self-Study Questions	17%
Reviews	7%
Homework Assignments	16%
Programming Assignments	15%
Exam 1	10%
Exam 2	15%
Exam 3 (Final)	20%
Total	100%

Activities

Activities are intended to guide you through thinking about algorithms.

Active Participation

Participation in class and through Piazza is expected and *appreciated*. A weak participation will not hurt your final score or letter grade. Active and beneficial participation will be considered by the instructor in case your score is borderline at the end of the term.

Self-Study Questions

Self-study questions are in general multiple-choice questions that make you think about the material just covered and are designed to help you understand it better. Some questions push you **to investigate and search on your own material not covered**. You will have enough time to review or research on line for help. You will be allowed to take them twice and keep the highest score. When your answer is wrong, consider reviewing the material and think about why your answer was wrong **before** the second attempt. Take the SSQ **before the deadline**: if the second try is late, a penalty will be applied to the highest score **EVEN** if the highest score was earned before the deadline. SSQs are due on **Saturdays by NOON**.

SSQs are not designed to trick you to lose points. No! They are designed to draw your attention to facts and pitfalls that a linear video presentation and simple REPETITION cannot highlight.

Reviews

Each module will have at least one Review that is similar to the Self-Study Questions. but covering a module or a part of the modules. Reviews are due on **Saturdays by NOON.**

Homework Assignments
You will have a **homework assignment** every week to explore new concepts not covered in class or deepen some concepts presented in the lectures**.** Homework assignments are due on **Saturdays by MIDNIGHT.**

Programming Assignments
You will have one **programming assignment** about every other week to implement some new concept or to illustrate some concept covered in class. Programming assignments can be completed in groups of **AT MOST** two students. **It is your responsibility to select a partner, to join a group, and announce it to the instructor at most one week after the class starts.** Programming assignments are due on **Sundays by MIDNIGHT**

Exams
Exam 1 covers up to Module 2. Exam 2 covers up to Module 4. Exam 3 covers all modules

Grading Scale
Grades are determined on straight percentages as follows:

Letter	Range
A	90%+
B	80-89%
C	70-79%
D	60-69%
F	59% or less

Auburn uses a 4.0 grade scale. An A equals 4.0; B, 3.0; C, 2.0; D, 1.0; and F equals 0.0. Students must maintain a 2.0 average GPA in all courses in order to progress in this program. If addition, students must earn at least a D in each individual course in order to earn credit and progress to the next course. For more detailed information about university grading standards, please refer to information on the following link:

- Auburn University Undergraduate Academic Policies on Grades

Course Policies

Late Assignment Policy

It is very important that students submit work on time, or they will find it very difficult to keep up. All work in the course (e.g., self-study questions, reviews, homework/programming assignments, and exams) will be due by **noon** or **midnight** CT on the date noted on the class calendar. Assignments may be submitted up to four days late with a **25 POINTS late** penalty per day. Students should reach out to their instructor immediately to discuss any concerns or to submit documentation of university-excused lateness.

All due dates and times in this course are specified in Central Time. For example, assignments are due no later than **noon** or **midnight** Central Time, not your local time. If you prefer, you can set Canvas to display dates and times adjusted for your local time zone. See the following URL for more information:https://community.canvaslms.com/docs/DOC-10622-4212717410

Program Policies

Citation Expectations

All research work submitted should be properly cited using the ACM Style Guide (https://www.cs.ucy.ac.cy/~chryssis/specs/ACM-refguide.pdf). For more information and tools to assist you in writing and research, refer to the citation management tools provided through the Ralph Brown Draughon Library.

Faculty Communication and Feedback

At the beginning of each course, make sure that you understand the instructor's preferred mode of communication and any specific communication protocol. For self-study questions, reviews, and all questions of interest for your classmates you **MUST U**se **Piazza** (**UP!**). Use email ONLY for private questions, or homework/programming solutions. One of the best ways to be effective as a student is to understand the instructor's expectations and operate within those boundaries. Students should give the instructor 48 hours to get back to them on any communication, and one week for grading turnaround time on major assignments. If students have concerns about communication or feedback, they should always go to the professor first. Students should *courteously* explain their concerns as clearly as possible without judgment or emotion. Effective communication is an important skill, and every interaction in this program is an opportunity to develop this skill.

Online Student Learning Expectations

You are also expected to have all the equipment and software needed to be successful in the course.

All students are expected to contribute to their own learning as active and well-prepared participants. Weekly modules will provide various opportunities for reading, reflection, applied experiences, and writing. Since these activities are woven through the entire week and generally do not require your "electronic presence" at any particular time or day, there should be no need to "miss" class. You should plan on spending the same amount of preparation and "in class" time on this course as you would if you were taking the course face-to-face. Try to spread the assignments throughout the week. Try to complete self-study questions and reviews by Thursday. **Slow,..... but Steady**.

Be Patient and Courteous. Stay Calm!

Problems with technology will inevitably arise. Don't worry and just keep smiling. Some answer keys (rarely) may turn out unclear, incomplete or wrong. They may appear as tricky. The objective of the instructor is NOT to trick you. The objective is to draw attention and stress on some aspects of the lecture. Take these incidents as opportunities to discuss them on Piazza. In any case, your score will always be promptly adjusted, if justified. Please be **patient** and **courteous** with your instructor and your instructor will be **prompt** and **courteous** with you. Your instructor will take technical problems into account if the situation warrants it.

Logging On

The learning activities for each week are carefully sequenced and offered in small chunks so you can accomplish reasonable amounts throughout the week. You should log on to the course website regularly to work through course materials and participate in Piazza discussions.

Posting Responses

Interaction between students is an important part of this course and requires prompt postings and responses. In an attempt to be efficient with our time and considerate of everyone's schedules—beyond the requirements of this course—we will operate under a consistent time structure for posting assignments and responses to Piazza discussions.

Submitting Assignments

You will submit all other types of individually written assignments by strictly following the turn in instructions spelled out in the assignment. Unless otherwise noted, assignments will be due by 11:59 am/pm CT (check on Canvas) on the date noted on the class calendar. **ADVICE**: always download and check your submissions to insure that you submitted the RIGHT version. We grade what IS submitted, NOT what SHOULD have been submitted. Should you submit the wrong version, lateness penalty will be applied with no exception.

Academic Integrity

Auburn University has adopted an Honor System proposed by its students and faculty to promote academic integrity and has enacted the following code:

"We, the faculty, instructors, and students of the (University course here) pledge to fulfill our mutual responsibilities to each other and the academic community at large with honor and integrity in order to build and maintain a climate of respect and trust that will enhance our research, teaching, and learning. We will support the Honor System of the School, and will not tolerate activities that undermine academic integrity."

Academic dishonesty is an offense that will be reported to the Academic Honesty Committee. Please refer to the following document for further information regarding academic honesty:
- [Auburn University Student Academic Honesty Code](#)

Accessibility

Students who need accommodations are asked to electronically submit their approved accommodations through AU Access and to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are immediately needed. If you need accommodations but have not established them, make an appointment with the Office of Accessibility, 1228 Haley Center, 334-844-2096.