Disclaimer
This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class.
Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.

CSE 310 Data Structures and Algorithms
Syllabus Outline

Note: detailed syllabus with deadlines and course schedule will be posted in the canvas shell before semester starts)

1. Course Information
   a. Catalog Description
      Advanced data structures and algorithms, including stacks, queues, trees (Red-Black trees, B, B+, AVL), and graphs. Searching in graphs, hashing, external sorting.

   b. Prerequisites
      MAT 243 Discrete Mathematical Structures
      CSE 240 Introduction to Programming Languages or CSE 220 Programming for Computer Engineering. This class use C/C++. CSE 240/CSE220 level proficiency in C/C++ is expected.

2. Textbook (Required)
   Cormen, T. H., Leiserson, C.E., and Rivest, R.L., *Introduction to Algorithms*, 4th ed., The MIT Press.

3. Course Goals
   a. Course outcomes
      Students who complete this course can
      1. define data structures (types) such as heaps, balanced trees, hash tables.
      2. explain how to use a specific data structure in modeling a given problem (e.g. I can explain how to model a dictionary using balanced trees).
      3. identify, construct and clearly define a data structure that is useful for modeling a given problem.
      4. state some fundamental algorithms such as merge sort, topological sort, Kruskal's algorithm, and algorithmic techniques such as dynamic programming and greedy algorithms.
      5. use a specific algorithmic technique in solving a given problem (e.g. I can write a dynamic program that solves a shortest-path problem).
      6. design an algorithm to solve a given problem
      7. define the notions of worst-case/best-case/average-case running times of algorithms.
      8. analyze and compare different asymptotic running times of algorithms.
      9. analyze a given algorithm and determine its asymptotic running time.
      10. combine fundamental data structures and algorithmic techniques in building a complete algorithmic solution to a given problem.
      11. create several algorithmic solutions to a given problem and choose the best one among them according to given requirements on time and space complexity.

4. Topics
    - Asymptotic Notation
    - Recursion, recurrence relations
    - Worst-case Analysis
    - Divide-and-conquer
    - Sorting and sorting lower bound
    - Median, Selection Problems
    - Hash Tables
    - Binary Search Trees, Red-Black Trees
    - Dynamic Programming
    - Longest Common Subsequence
    - Greedy algorithms
    - Graph Algorithms: Depth-first and breadth-first search, shortest path
    - Disjoint Sets (union-find): Introduction to Amortized Analysis;
    - String Matching (time permitting)

5. Class Format/Attendance:

This is an iCourse where all the lectures are pre-recorded and available to students each week. Instructor will have weekly live session(s) to discuss key concepts and conduct problem solving sessions over zoom. Live session times will be announced before the semester begin. These live sessions will be recorded and posted. However, students are strongly advised to attend and participate if their schedule permits.

In addition, our graduate TA will conduct weekly recitations. Recitation times will be announced before the beginning of the semester. Recitation attendance is expected (not mandatory). Recitations will be recorded. However, attending the recitations is highly recommended and recitation TA will take attendance even if points are not given for attendance.

6. Grading

Assessment & Grading

Assessment	**Percentage**
Exams (including the Final) :Midterm I – 12.5 %, Midterm II – 12.5 % Final Exam - 15%	40%
Recitation - 10% In-class/lecture review activities/quizzes - 10%	20%
Homework (Programming homeworks use C/C++)	40%
Total	**100%**

Final Grade Percentage

A+ >= 98%

A >= 90% and < 98%

B+ >= 88% and < 90%

B >= 80% and < 88%

C+ >= 78% and < 80%

C >= 70% and < 78%

D >= 60% and < 70%

E < 60%

7. Exams

   There will be absolutely no make-up exams. Exams will be conducted online remotely using lockdown browser and web cam.

8. Assignments

Assignments will include programming exercises. There will be about 5 assignments. **No late assignment will be accepted unless satisfying the following late/missed assignments policy.**

Late or Missed Assignments

If you need to miss a quiz/test/assignment, you must have a legitimate university approved excuse, such as a severe injury, illness, or participation in a legal proceeding that require your presence, etc. You must contact the instructor and provide satisfactory evidence prior to or within two days after the absence. A missed quiz/test/assignment without permission or supporting documents is a zero.

Notify the instructor BEFORE an assignment is due if an urgent situation arises and you are unable to submit the assignment on time.

Follow the appropriate University policies to request an accommodation for religious practices (Links to an external site.)Links to an external site. or to accommodate a missed assignment due to University-sanctioned activities (Links to an external site.)Links to an external site.

Extra credits(if any)

These will be awarded based on, e.g., good attendance and participation, in-class exercises that are given out randomly, extra problems in assignments or exams, etc., and at the discretion of the instructor.

9. Fulton Schools of Engineering (FSE) Academic Integrity Policy

Students in this class must adhere to ASU's academic integrity policy, which can be found at https://provost.asu.edu/academic-integrity/policy). Students must review this policy and become familiar with each of the areas in which academic dishonesty can occur.
All academic integrity violations will be reported to the Fulton Schools of Engineering Academic Integrity Office. The Academic Integrity Office (AIO) maintains a record of all violations and has access to academic integrity violations committed in all other ASU colleges/schools. Course content, including lectures, are copyrighted materials. In addition to ASU's academic integrity policy, students may not share outside the class, upload, sell or distribute course content or notes taken during the conduct of the course (see ACD 304–06, "Commercial Note Taking Services" for more information).

students must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the student first complies with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement

10. Collaboration for Assignments

Unless otherwise instructed, you can discuss the assignments with other students and exchange ideas about how to solve them. However, there is a thin line between collaboration and plagiarizing the work of others, i.e. cheating. In order that you do not cross that line, you are required to compose your own unique solution to each of the problems. You cannot use any code or solution written by any of your classmates.

Some obvious acts of cheating are:

* Turning in work/code done by someone else.

* Copying work/code done by someone else.

* Writing one code/solution together with someone else (it should be individual work).

All instances of cheating will be handled by the Dean's office according to the *FSE Academic Integrity Policy listed above*.

11. Title IX

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at http://sexualviolenceprevention.asu.edu/faqs/students.