Syllabus

CSE431/531, Fall 2021

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Course web site: http://www.cse.Buffalo.EDU/~xinhe/cse531 **(userid: cse531, password: students)**

Lectures: Mon, Wed, Friday, 1:50pm-2:40pm

Office hours: Mon. and Wed. 11:00 am - 12:00 noon

Course piazza link: To be announced.

Course Announcement:http://www.cse.Buffalo.EDU/~xinhe/cse531/announcements.html

- Piazza is used for communications between students and instructor/TA. You can post questions in piazza. Instructor posts announcement in piazza. Important notices will also be posted in Course Announcement section.

TA Information: http://www.cse.Buffalo.EDU/~xinhe/cse531/ta.html

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Required Textbooks and On-line Learning Material:

- **Textbook:**Introduction to Algorithms (3e), Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, and Clifford Stein, MIT Press, 2009

- **Class Notes:** http://www.cse.Buffalo.EDU/~xinhe/cse531/Classnotes
  - There are two files for each classnote: note**-1x2.pdf is for printing (here ** = 00, 01, 02 ...) note**.pdf is for displaying on a computer

screen (do not print this file, it contains too many pages).

Prerequisites: Advanced Data Structures (CSE250), Calculus II, and a course that requires formal proofs. (For example: Discrete Mathematics).

Course Description: This course introduces basic elements of the design and analysis of computer algorithms. For each topic, beside in-depth coverage, representative problems, their algorithms and applications shall be discussed.

Main Objective:

- Grasp the essential ideas in algorithm analysis and design
    - Algorithm analysis tools: basic definitions, limit test, integration method, master theorem, solving linear recursive equations etc.
    - Algorithm design methodologies (divide-and-conquer, greedy algorithms, dynamic programming.) Advanced examples of these methods.
    - Basic graph algorithms: BFS, DFS, MST, Shortest path problems, Max flow and its variations and applications, etc.
    - NP-completeness theory.
    - The concept and examples of approximation algorithms.
- Gain substantial problem solving skills in designing algorithms

At the end of this course, students should be able to:

- Have a good overall picture of algorithm analysis and design techniques
- Solve simple to moderately difficult algorithmic problems arising in applications
- Understand the notions of NP-completeness and approximation algorithms
- Be able to demonstrate the hardness of simple NP-complete problems

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Course Schedule: Link to tentative course schedule.

Course organization: The conceptual and theoretical course content will be delivered in the lectures, complemented by readings from the textbooks and lecture notes, and watching lecture videos.

You are required to study lecture notes and reading assignments before attending the lectures. (At least skim through them so that you are familiar with the basic definitions and simple examples, as they will not be discussed in class). The lecture time will be devoted to the proofs and complicated examples. Of course, you should review notes and reading material after the lectures.

Homework Assignments:
http://www.cse.Buffalo.EDU/~xinhe/cse531/Homework

- There are 6 homework assignments, approximately assigned every two weeks. You will have at least 10 days for each assignment.
- The homework can either be typed or hand-written. If hand-written, it must be clean and easily readable.
- Homeworks must be submitted by using UB Learn before deadline. Please do not ask us to accept late homework. Instead, turn in whatever you have been able to finish.
- Homeworks will count 18% of the grade of the course.
- Although the weight of homeworks is relatively low, it is a **Very Important and Essential Part** for learning algorithms. Problems similar to homework problems may appear in exams.

There are no programming projects.

Exams:

There will be two midterm exams and a final exam. Attendance at scheduled exams is required. The only acceptable excuse for missing an exam is a medical emergency with a note signed by a doctor. No other Make-up exams will be given.

Course Grading:

The following grade weights will be used (I reserve the right to make adjustments to the breakdown if I feel it is necessary):

Component	**Weight**
Assignments	18%
Midterm I	23%

Midterm II	23%
Final Exam	36%

Each component will receive a numerical score. The course letter grade will be based on the weighted total **s** of all components. The following table will be used for CSE531 students.

Percentage score s	**Letter Grade**
93 <= s <= 100	A
88 <= s < 93	A-
83 <= s < 88	B+
78 <= s < 83	B
73 <= s < 78	B-
68 <= s < 73	C+
63 <= s < 68	C
56 <= s < 63	D
0 <= s < 56	F

Depending on the class average, the curve maybe adjusted downward (for example, a student with a total percentage score of 91.7% may receive A). The curve will NOT be adjusted upward.

A separate table will be used for CSE431 students (about 6-8 points below the points given in the above table).

Re-grading

If you have a question about the grading of any piece of work, first consult with the teaching assistant who graded your work. If you cannot resolve your questions with the teaching assistant, you should consult with the instructor.

Any questions about the grading of a piece of work must be raised within one week of the date that the work was returned by the teaching assistant or the instructor.

Departmental Policy on Violations of Academic Integrity (AI)

The CSE Department has a zero-tolerance policy regarding academic integrity (AI) violations. The department is working on an updated version on this policy, and it will be posted soon. The main items of the policy are outlined below.

Any student accused of an academic integrity violation will be notified by the course instructor. This notification begins the review and appeals process defined in the University's Academic Integrity statement:

UB Academic Integrity Policy

Upon conclusion of the review and appeals process, if the department, school, and university have determined that the student has committed a violation, the following sanctions will be imposed upon the student:

§ 1.The department, school, and university will record the student's name in departmental, decanal, and university-level academic integrity violations databases.

§ 2. Penalty Assessment.

§ 2.1. The student's first academic integrity violation will cause the department to assign the student a grade of 'F' for the course, unless the course director deems it appropriate to assess a reduced penalty.

§ 2.2. The student's subsequent academic integrity violation(s) in any form and in any other course(s) will automatically cause the department to assign the student a grade of 'F' for the course, with no exception.

Example Infractions of Academic Integrity
Examples of conduct considered in violation of the policies on academic integrity include but not limited to:

- Use of unauthorized notes/materials during an exam/quiz
- Copying answers off another student's exam, quiz or homework
- Collaborating with others on assignments.
- Obtaining solution materials from books, web-sites or other means and using them without attribution to the original author.

Those found violating academic integrity will get an F in the course, and further actions, consistent with Department's Academic Integrity Policy, will be taken against them.