DEARBORN

CIS 350/3501
Data Structures and Algorithm Analysis
4 Credit Hours, Spring/Summer 2020

Lectures on Zoom: TR: 12:00 PM – 1:45 PM
Join URL: https://umich.zoom.us/j/96633313483

Contact Information:

Prof. Jinhua Guo
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Office Hours: T: 10:30 AM – 12:00 PM, R: 5:00 PM – 6:30 PM, or by appointments

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Office Hours: M 11:00 AM – 12:00 PM, R 8:00 – 9:00 PM

Course Description:

This course focuses on data design and algorithm design. Data design topics include object-oriented discussions of hashing, advanced tree structures, graphs, and sets. Algorithm design topics include the greedy, divide-and-conquer, dynamic programming, backtracking and branch-and-bound techniques. A significant discussion of algorithm complexity theory, including time and space trade-offs and elementary computability theory, is included.

Prerequisites: MATH 115, CIS 200, CIS 275.

Program Goals/Outcomes:

https://umdearborn.edu/cecs/departments/computer-and-information-science/undergraduate-programs/bs-computer-and-information-science/educational-objectives

Course Objectives/Outcomes:

- The student will be able identify common algorithmic strategies (greedy, divide-and conquer, backtracking, brute force, heuristics)
- The student will be able to compute the θ( ) worst case time and space complexity
- The student will be able to create object-level test plans and generate test cases
- The student will be able to perform detailed analysis of algorithms (complexity, time and space tradeoffs, computability)

Required Materials and/or Technology:

Required Text Book (any language version chosen from the following)

Data Structure and Algorithms in C++ by Michael Goodrich, Roberto Tamassia, & David Mount, Wiley, Second Edition

Data Structure and Algorithms in Java by Michael Goodrich, Roberto Tamassia, & Michael Goldwasser, Wiley, Sixth Edition

Data Structure and Algorithms in Python by Michael Goodrich, Roberto Tamassia, & Michael Goldwasser, Wiley

Recommended Books

- *Data Structures and Algorithm Analysis in C++ by* Mark Allen Weiss, Addison Wesley.

Assignment and Grading Distribution (subject to change**):**

Projects 1-2 (first half):	20%
Projects 3-4 (2nd half):	20%
Homework assignments	10 %
Midterm exam:	20 %
Final exam:	30 %
Total:	100%

Late work will be penalized at a rate 10% per actual day for up to 3 days then 0%, as will evidence of cheating in any form.

Grading Scale:

[98%- 100%]	A+	[83%- 87%)	B	[70%-73%)	C-
[93%- 98%)	A	[80%- 83%)	B-	[67%-70%)	D+
[90%- 93%)	A-	[77%-80%)	C+	[63%-67%)	D
[87%- 90%)	B+	[73%-77%)	C	[60%-63%)	D-

Less than 50% average on exam will result in a maximum of a D grade regardless of grades achieved on any other class grading criteria.

Students with 50% or less on the Final Exam will Fail the class.

Main Topics

Topic #	Topic
1	Review of C++
2	Algorithm Analysis
3	Binary Trees and Traversals
4	AVL Trees, B Trees,

5	Hashing
6	Priority Queues
7	Midterm Exam
8	Graphs
9	Graphs
10	Set ADT
11	Sorting
12	Algorithm Design
13	Algorithm Design
14	Amortized analysis/ Random Algorithms

Course Policies

Due Dates: All assignments are due at 11:59 pm on the date specified. Projects may be turned in up to three days later, at a penalty of 10% per day. Exceptions to these rules will be made only under exceptional circumstances, and then only with an appropriate written excuse.

Grade disputes and corrections: If you are dissatisfied with a grade you receive, you need to contact me **within one week** of the date that I first attempted to return the exam or assignment results to you.

Plagiarism: Although students are encouraged to help their classmates, students sharing code are guilty of plagiarism. If programs are considered too similar, the students will be asked to explain. In all cases of cheating, students who supply code or take it will both be penalized. **The minimum penalty for all students involved in cheating is failure on the assignment**. The assignments in this class are for student use only. You are not allowed to post any assignments on the Internet or share them with other students. Students who turn in questionable programs and homework assignments are subject to defend them orally to the professor without warning.

University-wide Policies or Statements Relevant to Courses:

Please see the 'Course Policies' Menu on Canvas for information on the following:

- University Attendance Policy
- Academic Integrity Policy
- Counseling
- Disabilities Services
- Safety Statement
- Harassment, Sexual Violence, Bias, and Discrimination