CS624 (Analysis of Algorithms) – Syllabus

Nurit Haspel

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Course Description and Objectives

The design and analysis of algorithms. This is a theoretical course. No programming is involved.

- The design and analysis of algorithms, including run time analysis.
- Familiarity with advanced algorithmic techniques such as divide and conquer, dynamic programming, graph algorithms and greedy algorithms.

Prerequisite

CS220 (formerly CS320) – Applied Discrete Math, or permission from the instructor.

Textbooks

- Required: Introduction to Algorithms, 3rd or 4th Edition by Cormen, Leiserson, Rivest, and Stein. MIT press 2009 or 2022. ISBN - 9780262033848 (3rd edition), 9780262046305 (4th edition)
- Highly recommended: The Algorithm Design Manual, Second Edition by Steven S. Skiena Springer-Verlag, 2008

Topics

- Runtime analysis and growth rate.
- Sorting – Heapsort, Quicksort, theoretical boundaries on sorting.
- Binary search trees.
- Dynamic programming.
- Greedy algorithms.
- Randomized algorithms.
- Amortized analysis.
- Graph algorithms and applications - graph traversals, flow problems.
- Introduction to complexity classes: P=NP? and approximation algorithms.
- Other topics may be covered if time permits.

Assignments and Grading

The following grading scheme is subject to change (I will do my absolute best to not change it and if I do, I'll let you know):

- Homework Assignments – 20% of your final grade

- Two Midterms – 20 % of your final grade each (40% total)

- Final exam – 40% of your final grade. You must also pass the final exam (at least with a grade of 60) to pass the course.

You must have a documented reason to schedule a makeup exam. I must know that you need a makeup exam within 2 days after the exam date.

Final Grade

Your final grade will be calculated using the following table. The minimum standard for passing the course is a percentage score of 60%. You also must pass the final exam (score at least 60% in the final exam). Keeping this in mind, your grade for the course will be calculated using the following table.Assume your final percentage score for the course is P:

$P > 90$	A
$85 < P \le 90$	A-
$80 < P \le 85$	B+
$75 < P \le 80$	B
$70 < P \le 75$	B-
$65 < P \le 70$	C+
$60 < P \le 65$	C

This is a graduate course, therefore the minimum passing grade is C.

Accommodations

Section 504 of the Americans with Disabilities Act of 1990 offers guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center for Disability Services, M-1-401, (617-287-7430). The student must present these recommendations and discuss them with each professor within a reasonable period, preferably by the end of Drop/Add period.

Student Conduct

Students are required to adhere to the University Policy on Academic Standards and Cheating, to the University Statement on Plagiarism and the Documentation of Written Work, and to the Code of Student Conduct as delineated in the catalog of Undergraduate Programs, pp. 44-45, and 48-52. The Code is available online at:

https://www.umb.edu/academics/seas/undergraduate-studies/academic-policies/code-of-student-conduct/

AI is prohibited

In this class, all work submitted by students must be generated by the students themselves. Students should not have another person or entity do the writing of any portion of an assignment; this includes hiring a person or a company to write assignments and using AI tools like ChatGPT. All work submitted must contain citations for any material that has been quoted or referenced. If students are unsure about whether or not a source is appropriate to use in the assignment, they should contact the instructor.

Class email

Should I need to send the class an e-mail, I will use your umb address (`firstname.lastname<number>@umb.edu`. The number is usually 001). Please make sure you check it regularly, including your junk mailbox.

Homepage

The course home page is `http://www.cs.umb.edu/cs624`.