

CS 422: Algorithms Design and Analysis

Winter 2019

Professor: Dr. Hadi Shafei

Office: 2223 Jamrich Hall

Office Hours: MWRF 11:00 am - 12:00 pm

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Classroom: Jamrich 3313

Class Hours: MWF 1:00 pm - 1:50 pm

Course Description

The purpose of this course is to introduce fundamental techniques to support the design and analysis of algorithms. In doing this, we will focus on both the underlying mathematical theory and practical considerations of efficiency. Topics include asymptotic complexity bounds, techniques of analysis, and algorithmic strategies.

Course Topics

- The worst case model of complexity, upper bounds, and orders of growth.
- Design and analysis of recursive algorithms and solving recurrence relations.
- Sorting algorithms and divide and conquer.
- Graph algorithms: breadth-first search, depth-first search, strongly connected components, minimum spanning trees, and single-source shortest paths.
- Greedy algorithms.
- Dynamic programming.
- Complexity classes P and NP, NP-hard and NP-complete problems.

Textbook

We use the third edition of *Introduction to Algorithms* by Cormen, Leiserson, Rivest, and Stein, also known as *CLRS*.

Grading Policy

Grades will be based on quizzes (10%), a midterm exam (20%), assignments (40%), and a final exam (30%).

Late Submission Policy

Due dates are strict. Late submissions are penalized 10% per day.

Cellphone and Laptop Policy

Cellphone use for the purposes of texting, email or other social media is not permitted. Use of laptops is not allowed in class except when it is required for an assignment. All electronic devices should be silenced.

Academic Dishonesty Policy

Students have an obligation to abide by accepted standards of academic honesty, which dictate that all scholastic work shall be original in nature. Procedures and penalties pertaining to academic dishonesty are outlined in the NMU Student Handbook.

Disabilities Services

If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Dean of Students Office at 2001 C. B. Hedgcock Building (227-1700). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.