

CSC 282/482 Design & Analysis of Efficient Algorithms

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Course Description

How does one design programs and ascertain their efficiency? Greedy algorithms, dynamic programming, divide-and-conquer techniques, string processing, graph algorithms, mathematical algorithms. Introduction to NP-completeness and linear programming.

Topics covered

The course gives you a comprehensive understanding of algorithmic techniques, analysis and how to solve related problems. Topics include:

- Greedy Algorithms.
- Dynamic Programming
- Graph Algorithms
- Divide and Conquer applied to different problems.
- Linear Programming and NP problems.

Recommended Textbooks

CLRS = Introduction to Algorithms (3rd edition), T. Cormen, C. Leiserson, R. Rivest, and C Stein, 2009.

DPV = Algorithms, S. Dasgupta, C. Papadimitriou, U. Vazirani, 2006.

Additional Readings

- Algorithms, J. Erickson, 2013.
- Algorithm Design, J. Kleinberg and E. Tardos, 2005.
- The Design and Analysis of Algorithms, D. Kozen, 1991.
- The Design and Analysis of Computer Algorithms, A. Aho, J. Hopcroft, J. Ulman, 1974.
- Algorithms Algorithms, R. Johnsonbaugh, M. Schaefer, 2003.
- How to Think About Algorithms, J. Edmonds, 2008.
- Probability and Computing: Randomized Algorithms and Probabilistic Analysis, M. Mitzenmacher, E. Upfal, 2005.
- Randomized Algorithms, R. Motwani, P. Raghavan, 1995.
- Approximation Algorithms, V. Vazirani, 2004.
- Algorithms, R. Sedgewick, K. Wayne, 2011.
- The Algorithm Design Manual, S. Skiena, 2008.

Prerequisites

(MTH 150 AND CSC172) OR MTH172

Grading Policy

- All appeals of grades for any component of the course (homework, project, quiz, exam, etc.) must be made within ONE WEEK of the grade being posted. Please address all regrading requests only to me. Your work (submission) will be reconsidered as a whole and the reassessment may result in the grade remaining the same, being raised, or being lowered.
- I reserve the right to curve the scale dependent on overall class scores at the end of the semester.
- The grade will be determined taking into account the following:
 - The two midterms are worth **20%** each.
 - The final exam is worth **40%**.
 - Homework/Submissions are worth **15%**.
 - Attendance is worth **5%**

**Note:* Requirements for graduate students may be different from requirements for undergraduate students.

Grading Scale

- The following table is an estimate of how the numeric grades will map onto the letter grades:

Percentage score	Letter grade
90-100	A
85-89	A-
80-84	B+
75-79	B
70-74	B-
65-69	C+
60-64	C
55-59	C-
50-54	D
0-49	F

Course Policies

Accommodations for Disabilities

- The University of Rochester respects and welcomes students of all backgrounds and abilities.
- All approved accommodations will be arranged with the instructor.

Communication and information about the course

- Relevant information and updates about the course will be posted on Blackboard. It is your responsibility to regularly check for updates.
- Emails sent to the instructor about this course include in the subject "**CSC282/482:**".
- Slack channel available for the course: see BB.

During lecture

- Interactions/discussions are welcome in classroom. The only rule is that everyone must be respectful to others.
- Unless otherwise indicated by the instructor, you don't need any electronics in class.
- All materials that will be posted/distributed in the course are for personal use.
- Distribution of notes, videos, pictures, slides, code presented in the course is prohibited.

- Please note **Section V.7** of the College's Academic Honesty policy regarding Unauthorized Recording, Distribution or Publication of Course-Related Materials.
- Every exception to the above has to be agreed with the instructor of the course beforehand.

Policies on Incomplete Grades and Late Assignments

- A grade of "I" can be given only in circumstances beyond the students' control, such as illness or personal emergency, that prevented the students from finishing the coursework on time. Please refer to the Academic Procedures for more information on this.
- Late submissions are not permitted in this course.

Academic Integrity and Honesty

- All assignments and activities associated with this course must be performed in accordance with the University of Rochester's Academic Honesty Policy. More information is available at <http://www.rochester.edu/college/honesty>
- All the work you do in this course must be your own contribution.
- Specific requirements/details may be posted with each assignment.
- For every submission/answer you must be able to explain your work in person at any time.
- During exams you are not allowed to use any textbooks, notes or other sources (web,forums, friends,etc.).
- For **homework** you are allowed to use textbooks and notes from lectures while you are working on finding solutions to the problems. You can also discuss with other students from the course. However, when you type/write the solution/program you shouldn't use any notes or help. You should write it completely on your own.