Syllabus for CSE 551 Foundations of Algorithms
Fall 2022
Computer Science Program
School of Computing and Augmented Intelligence
Arizona State University

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Textbook and Course Outline

Recommended Text: Algorithm Design by Kleinberg & Tardos
Note: A significant amount of course material will come from sources other than the textbook. As such, class attendance is strongly recommended.

- Introduction
  - Growth of functions
  - Complexity of computation
  - Recurrence relations
- Divide and Conquer
  - MaxMin in a sequence
  - Binary search
  - Quicksort
  - Mergesort
  - Strassen's matrix multiplication
- Dynamic Programming
  - Matrix chain multiplication
  - Optimal polygon triangulation
  - Optimal binary tree
  - Longest common subsequence
  - Traveling Salesman Problem
- Greedy Algorithms
  - Chromatic number
  - Knapsack
  - Set cover
  - Minimum spanning tree
  - Event scheduling
- Network Flows
  - Max-flow Min-cut Theorem
  - Ford-Fulkerson Algorithm
- NP-Completeness
  - Problem transformation
  - No-wait flow shop scheduling
  - 3-Satisfiability
  - Traveling Salesman Problem
  - Node Cover
- Approximation Algorithms
  - Node Cover
  - Bin Packing
  - Scheduling
  - Steiner Trees

- *** The course outline may be modified (some problems may be replaced by other problems in each of the topics), depending on class needs and progress.

Grading Policy for CSE 551

- There will be one mid-term and a final. In addition, there will be two quizzes and programming and homework assignments

Tests and Assignments	Percentage
Mid-term	20%
Final	30%
Quizzes 1 and 2	20%
HW & Programming Assignments	30%

Tentative Grading Criterion (this criterion are not final and may be modified if needed)

- 90% will ensure A, 80% will ensure B, 70% will ensure C and so on
  - Loss of points due to late submission of assignments
  - 1 day 50%
  - 2 days 75%
  - 3 days 100%

Cheating Policy

- Any case of cheating will be severely dealt with.
- Penalty for cheating will be in accordance with the policies of the Fulton Schools of Engineering and Arizona State University.
- Multiple offenders may be removed from the program and the University.

Title IX Statement

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, https://goto.asuonline.asu.edu/success/online-resources.html.