

CS 5120 : DESIGN AND ANALYSIS OF ALGORITHMS

<i>Semester Hours:</i>	3.0	<i>Contact Hours:</i> 3
<i>Coordinator:</i>	Tianyi Song	
<i>Text:</i>	Introduction to Algorithms	
<i>Author(s):</i>	CORMEN, LEISERSON, RIVEST, AND STEIN	
<i>Year:</i>	2009	

SPECIFIC COURSE INFORMATION

Catalog Description:

Algorithms for solving problems that occur frequently in computer applications. Basic principles and techniques for designing and analyzing algorithms. Introduction to computational complexity, divide-and-conquer, dynamic programming, greedy approach, and graph algorithms. Prerequisites: Full Admission to MS in CS program or consent of department.

Course type: **REQUIRED**

SPECIFIC COURSE GOALS

- I can determine the complexity of an algorithm.
- I can explain and implement different types of algorithms (e.g., Divide-and-Conquer, Dynamic Programming, Greedy Algorithms).
- I can explain and implement different graph algorithms.
- I understand the classes of algorithms (P, NP, and NP-complete) and the role of polynomial-reduction in establishing NP-completeness.
- I understand the implications of algorithm design in real-world applications.
- I can analyze relevant research and communicate my findings.

LIST OF TOPICS COVERED

- Introduction (1 week)
- Algorithmic Complexity (1 week)
- Divide-and-Conquer Strategy (2 weeks)

- Binary Search Trees (1 week)
- Dynamic Programming (3 weeks)
- Greedy Algorithms (1 week)
- Graph Algorithms (3 weeks)
- NP-Complete Problems (3 weeks)