CS 5120 DESIGN AND ANALYSIS OF ALGORITHMS

 Semester Hours: 3.0
 Coordinator: Robert Dyer
 Text: Introduction to Algorithms
 Author(s): CORMEN, LEISERSON, RIVEST, AND STEIN
 Year: 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. Prerequisite:
Full Admission to MS in CS program or consent of department is required for enrollment.

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

STUDENT OUTCOMES ADDRESSED BY THIS COURSE

• B.1 Analyze a given problem, and identify and define the computing requirements
  appropriate to its solution
• B.3 Apply mathematical foundations, algorithmic principles, and computer science theory
  as appropriate in modeling and solving real-world problems

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)