CMSC 451 Syllabus  Design and Analysis of Computer Algorithms  Summer 2003

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Course Overview:  This course covers methods for analyzing and designing efficient computer algorithms, and P vs. NP-complete analysis.

Prerequisites:  CMSC 214 & CMSC 351

Text:  Cormen, Leiserson, Rivest, Stein  Introduction to Algorithms--Second Edition

Grading:

2 Midterm Exams:  25% each
1 Final Exam:  35% OR 1 Final Exam:  50%  [Whichever method gives the best overall grade. No makeup exams given.]
Homework:  15%  Homework:  15%

Course Outline

351 Review
  Programming, Asymptotics, Recurrences, Sorting  1 Lecture

Sorting Algorithms (Chapts. 6-8)
  Comparison vs. Non-comparison Sorting Algorithms  1 Lecture

Binary Search Trees (Chapts. 12-13)
  Simple and Balanced  1 Lecture

Dynamic Programming (Chap. 15)
  Matrix Chain Mult., Optimal Binary Search  Weeks 1 & 2

Greedy Algorithms (Chap. 16).
  Knapsack problem, Huffman codes  Week 3

Graph Algorithms (Chapts. 22-24)
  Minimum Spanning Tree, Single-Source Shortest Paths, Rete Algorithm (optional)  Weeks 3 & 4

Linear Programming (Chapt. 29)
  Simplex Algorithm  1 Lecture

NP-Completeness (Chapts. 34-35)
  P and NP classifications, NP-complete problems, Polynomial Reductions (SAT, independent set, vertex cover, clique, Hamiltonian path, TSP), Techniques to cope with NPC problems.  Weeks 5 & 6

Policies

Homework is due (accepted) only at the beginning of class. You may discuss homework assignments however copied homework will not be graded. Exams are photocopied before they are returned to students. Attendance is noted and may impact final grade.