

CMSC 451: Design and Analysis of Algorithms

Spring 2005

<http://www.cs.umd.edu/class/spring2005/cmssc451/>

Instructor: Aravind Srinivasan - Office: AVW 3227. Phone: 405-2695; E-mail: srin@cs.umd.edu.
Office hours: Tue, Thu 10 - 11AM.

Class Time: TuTh 12:30 - 1:45 PM, Room: CSI 2107.

Teaching Assistant: Nan Wang, nwang@cs.umd.edu. Office hours: Mon, Wed 4PM - 5PM, held in AVW 1112.

Final and Mid-Term Exams: The final examination, according to the official university schedule, will be on Friday, May 20, 1:30 – 3:30PM. The midterm will be on Thursday, March 17, during class hours (12:30–1:45 PM). Both exams will be held in the classroom, and will both be closed-book, closed-notes.

Course Overview: This course presents the fundamental techniques for designing efficient computer algorithms, proving their correctness, and analyzing their complexity. General topics include graph algorithms, and basic algorithm design paradigms (such as divide-and-conquer, dynamic programming and greedy algorithms), lower bounds and NP-completeness.

Text: Jon Kleinberg and Éva Tardos, *Algorithm Design*, Addison-Wesley, to appear in 2005. Students are asked to buy a preliminary version of the book in the Armory Building, Room 0127, phone number 301-314-2679.

Prerequisites: CMSC 351. Each student is expected to know the basic concepts of programming (e.g. loops, pointers, recursion), discrete mathematics (proof by induction, sets), simple data structures (lists, stacks, queues, trees, heaps), and calculus (logarithms, differentiation, integration). We will assume knowledge of the basic algorithm-analysis techniques covered in CMSC 351.

Coursework: The coursework will consist of 5-7 homework assignments, a small project and two exams (one midterm and a comprehensive final). Homework problems will be mathematically oriented.

Homeworks are to be turned in at the start of class on the due date. Since homework solutions will be handed out on the day the homework is due **NO LATE HOMEWORKS WILL BE ACCEPTED**. (In other words, hand in whatever you have finished. You are also welcome to turn in homeworks *before* the due date if you cannot come to class on the due date.) If you cannot come to class for some reason, please mail the homework to instructor (should be postmarked a day *before* the due date).

All homeworks are to be done independently, with no help from the web, or other sources. If you have questions, please talk to the TA or the Instructor. Assignments are to be written up **NEATLY**. Badly written assignments **WILL NOT** be graded. Please staple your homework. *It is your responsibility to make sure that you pick up all homeworks and handouts. All course information and handouts will be available on the web page.*

Grading: Final grades will be based on homework assignments, the project, the midterm exam, and the comprehensive final exam. The relative weights of these will be 20% for the homework total, 10% for the project, 30% for the midterm, and 40% for the final exam. Graduate students in this class will be given extra work on homeworks and exams.

Syllabus: The topics, times and order listed below are tentative and are subject to change: Graph exploration: 4-5 lectures; Greedy algorithms: 4 lectures; Divide and Conquer algorithms: 4 lectures; Dynamic programming: 5 lectures; String-type algorithms: 1 lecture; Lower Bounds: 1 lecture; NP-completeness and Intractability: 5 lectures; Approximation Algorithms: 2 lectures; and Randomized Algorithms: 2 lectures.

Health-related Absences: Students claiming a excused absence must apply in writing and furnish documentary support (such as from a health care professional who treated the student) for any assertion that the absence qualifies as an excused absence. The support should explicitly indicate the dates or times the student was incapacitated due to illness. Self-documentation of illness is not itself sufficient support to excuse the absence. The instructor is not under obligation to offer a substitute assignment or to give a student a make-up assessment unless the failure to perform was due to an excused absence. An excused absence for an individual typically does not translate into an extension for team deliverables on a project.

Disability Information: Any student eligible for and requesting reasonable academic accommodations due to a disability is requested to provide, to the instructor in office hours, a letter of accommodation from the Office of Disability Support Services within the first two weeks of the semester.

Additional Remarks: Students are strongly encouraged to facilitate an interactive class, by asking questions, suggesting alternative/better solutions etc.