Course Information

10th Jan, 2005

	Instructor	TA
Name	Prof. Vinod Variyam	Mengke Li
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Office Hours	MWF 10.30am-11.30am and by appointment	TR 2.30pm-5.00pm

	Venue	Time
	109 Avery Hall	MWF 9.30-10.20am

We will maintain a course page at http://www.cse.unl.edu/∼vinod/823S05/index.html. Upto-to-date information will be kept here.

Relevance and Broad description. Algorithms (A step-by-step problem solving procedure) for problems such as sorting, graph reachability, matching etc., are at the heart of almost all real-life computer applications. Efficiency/correctness of these algorithms directly influence the overall efficiency/correctness of these applications. Hence it is important to come up with very fast and correct solutions to these basic computational problems. As the name suggests, this course has mainly two aspects: designing algorithms for basic computational problems and analyzing their correctness and efficency. These two aspects goes hand in hand with each other. Since the issues that it deals with are widely applicable in all areas of computer science, it is a core course in the computer science curriculum.

Learning Goals. The main learning goal of the course, is to teach students how to design *correct* and *efficient* algorithms. That is, through this course students will develop skills in a) employing various design methodologies to come up with new algorithms and b) using mathematical methods in analyzing the quality of algorithms. The course will also introduce students to the notion of intractability of computational problems via the theory of NP-completeness.

Methods. The emphasis of this course will be on relatively high level description of the algorithms rather than lower level implementation details. This makes it a higher, abstract level course than many other programming based courses. In particular, all the main analysis tools will be mathematical in nature.

Prerequisites. The prerequisites for the course is CSCE 310, Data Structures and Algorithms, or equivalent background.

Textbook and Topics. The main topics that I intend to cover are listed below. Most of the lectures will be based on the well-known text book *Introduction to Algorithms*, by T. H. Corman, C. E. Leiserson, R. L. Rivest and S. Stein. We will distribute handouts for any additional materials that we cover. Tentatively, we will cover the following topics.

1. Median and Order Statistics (Chapter 9)
2. Graph algorithms (Chapters 23,24, 25, and 26).
3. NP-completeness (Chapter 34).
4. Approximation algorithms (Chapter 35).
5. Some selected topics (From Chapters 27-33).

75% of the lectures will be devoted to topics 1 through 4. The remaining lectures will be devoted to certain selected topics which will be announced later into the course.

Grading.

Grading will be based on homework assignments and exams. Grading guidelines will differ for students registered for 423 and those registered for 823. In particular, 823 students are required to solve more problems, both for homework assignments as well as for exams.

Homework Assignments. There will be many (5-6) homework assignments. Roughly, you may expect one assignment every two weeks. Assignments are due at the beginning of the class on the given due date. No late assignments will be graded. Clarity and legibility of presentation of your submission are as important as your answers to problems. You are very strongly advised to typeset your solution using some document processing system. If the grader cannot easily read your writings, you may not be awarded full points even if you claim your answers are correct. Each assignment will contain two sets of problems; *core* problems and *advanced* problems.

Core: Most of the problems in this set can be solved in a relatively straightforward manner, once the materials covered in the lectures are understood. All enrolled students (for both CSCE 423 and CSCE 823) are required to submit solutions to this set of problems towards their grade.

Advanced: Solutions to advanced problems will be more difficult and often involve applying the algorithms and techniques in non-obvious ways. *Only* students enrolled for 823 are required to submit solutions to this set of problems. 423 student may get extra credits for doing advanced problems.

Collaboration Policy. *No* collaboration is allowed for core problems. You may only discuss these problems with the instructor or the TA. You may discuss approaches to solving the advanced problems with your classmates. But, all the details should be worked out and written up by yourself, with due acknowledgments to those with whom you discussed the problems.

These policies will be strictly enforced. Violation of any of the above rules as well as any other academic dishonesty will be dealt with harshly.

Examinations. There will be two in-class exams and a finals. Each exam may have additional problems for 823 students.

Exam Schedule: Following is the tentative schedule for the exams.

Pretest	:	Friday, 14th January, 2005
Midterm 1	:	Friday, 11th February, 2005
Midterm 2	:	Friday, 11th March, 2005
Finals	:	Thursday, 5th May, 2005
		Time 7:30 to 9:30am

Grading Breakdown

The contribution of homeworks and exams towards your final grades is as follows.

Homework	60%
Midterms	25%
Finals	15%

Following table gives the tentative conversion of marks to letter grades. It may be modified if necessary. For example, if the class average is less than 75, the final weighted marks will be scaled appropriately to calculate the letter grades. Letter grade of A^+ will be given to students who perform exceptionally well in the course.

Marks to letter grade conversion

≥ 95	:	A
≥ 90 and < 95	:	A^-
≥ 85 and < 90	:	B^+
≥ 80 and < 85	:	B
≥ 75 and < 80	:	B^-
≥ 70 and < 75	:	C^+
≥ 65 and < 70	:	C
≥ 60 and < 65	:	C^-
≥ 55 and < 60	:	D^+
≥ 50 and < 55	:	D
< 50	:	F

Academic Dishonesty

The department of Computer Science and Engineering adopted an Academic Integrity Policy on May 3, 2001. Students enrolled in any computer science course are bound by the policy. I strongly recommend every student to read and understand it. Any violation of the policy will be dealt with severely. You can read the policy at `http://cse.unl.edu/Student_Resources/AcademicIntegrity.php3`.

Suggestion Box

I strongly encourage you to submit suggestions and/or comments that you may have regarding any aspect of the course, in the anonymous suggestion box kept at

`http://www.cse.unl.edu/~vinod/823S05/suggestion.shtml`.

You can submit your name and email address with you suggestion, but it is not mandatory.