CSE 5311: Design And Analysis of Algorithms
Fall 2011

Instructor: Dr. Gautam Das

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Office Hours: Wed 03:00-04:00 pm, Thu 02:30-03:30 pm
Section Information: CSE 5311:002

Time and Place of Class Meetings: ERB 131, Tue-Thu 03:30-04:50 pm

Description of Course Content: Techniques for analyzing upper bounds for algorithms and lower bounds for problems. Problem areas include: sorting, data structures, graphs, dynamic programming, combinatorial algorithms, introduction to parallel models.

Student Learning Outcomes: This course is designed to teach you, at the graduate level, algorithm design and analysis paradigms, advanced data structures and their use in efficient algorithms, graph algorithms, the theory of NP-completeness, and some specialized topics (to be determined based on student input).

At the end of the semester you should:
• be familiar with the algorithms and algorithmic techniques covered,
• be able to argue correctness and analyze the running time of a given algorithm,
• be able to design new algorithms for new situations, using as building blocks the algorithms and techniques
• be able to prove a problem is NP-complete using reduction.

Requirements: These are the prerequisites for this course.
● Algorithms & Data Structures (CSE 2320)
● Theoretical Computer Science (CSE 3315

Required Textbooks and Other Course Materials:
      Textbook:
      • Cormen, Leiserson, Rivest, Stein, Introduction to Algorithms, 2nd ed., MIT Press, 2001.
      References:
      • The Design and Analysis of Algorithms 1974, AV Aho, JE Hopcroft and JD Ullman,
      Addison-Wesley Publishing Company
      • Introduction to Algorithms: A Creative Approach, Reprinted 1989, Udi Manber, AddisonWesley Publishing Company
      • Introduction to Algorithms, 1982, Sedgewick, Addison Wesley Publishing Company
      • Graph Algorithms, 1979, Shimon Even, Computer Science Press
      • Introduction to the Theory of Computation, 1992, Michael Sipser, PWS Publishing Company
      • The Art of Computer Programming, Vols. 1 and 3, Knuth, Addison Wesley Publishing Company

Descriptions of major assignments and examinations: Your grade will be based on the following things:

• Midterm:
      o There will one midterm exam during the semester (non comprehensive).
      o There will be no make up exams!
• Quizzes:
      o There will be a few short quizzes during the course which will help to test your understanding of the concepts taught.
      o Quizzes will generally be allotted 15-20 minutes at the end of the class period. Quizzes will be announced at least a week in advance.
• Project:
o Students will have a choice of two types of projects:
      Programming project:

• Students will be assigned a programming project in which they can prove that they have understood a specific part of the curriculum. Projects may either be done solo or in teams of two students each.
• The programming tasks should be chosen by consultation with the Instructor. Students are encouraged to approach the Instructor with proposals on the programs they envision.
• Students will be encouraged to demo their programming projects to the instructor and the GTA.
• Programs have to be turned in to the GTA by the last due day after which late penalty may be applied.

Research paper and presentation:
• Students will be required to write a research paper (around 10 pages) on a specific topic or problem and present it to the rest of the class in 15-20 minute seminars. These projects may either be done solo or in
teams of two students each.
• The paper's topic should be chosen by consultation with the Instructor. Students are encouraged to approach the Instructor with proposals on the topics of their papers.
• Papers have to be turned in to the Instructor at least a week before the presentation. Scheduling presentations will be done during the semester by consulting with the Instructor.

• Final:
  o There will one non-comprehensive final exam at the end of the semester.
  o There will be no make up exams!

Attendance: Attendance is not required, but is highly encouraged. Consult me in advance if you must miss class for a good reason.

Grading:
  ● Midterm   30%
  ● Quizzes   25%
  ● Project   15%
  ● Final   30%

Make-up Exams:
Make-ups for (non-exam) graded activities may be arranged if your absence is caused by illness or work/personal emergency. A written explanation (including supporting documentation) must be submitted to your Instructor. If the explanation is acceptable, an alternative to the graded activity will be arranged. Make-up arrangements must be arranged prior to the scheduled due date.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current undergraduate / graduate catalog

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/ses/fao).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Academic Integrity: At UT Arlington, academic dishonesty is completely unacceptable and will not be tolerated in any form, including (but not limited to) "cheating, plagiarism, collusion, the submission for credit of

any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts" (UT System Regents' Rule 50101, §2.2). Suspected violations of academic integrity standards will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may contact the Maverick Resource Hotline by calling 817-272-6107, sending a message to resources@uta.edu, or visiting www.uta.edu/resources.

Lab Safety Training: Not Applicable.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory will be asked to complete an online Student Feedback Survey (SFS) about the course and how it was taught. Instructions on how to access the SFS system will be sent directly to students through MavMail approximately 10 days before the end of the term. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback data is required by state law; student participation in the SFS program is voluntary.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.