Computer Science 653  
Analysis of Algorithms  
Spring 2017  

Instructor: Andreas Stathopoulos, andreas@cs.wm.edu, ph: 1-3483  
Time/Place: TR 9:30 am – 10:50am, Blow Memorial Hall 331  
Office hours: TR 11:00 am – 1:00 pm in MS 104B  
Webpage: http://www.cs.wm.edu/~andreas/653/F05/  

Description:  
This course teaches you the techniques for designing efficient algorithms for solving a given problem, and provides the necessary means for analyzing their performance. Analysis tools, including the worst case and average case analysis, and design methodologies such as greedy methods, divide and conquer, and dynamic programming are presented. The additional topics are chosen from matrix and numerical operations, parallel algorithms, randomized algorithms, and NP-completeness. Some of the above topics will be covered in greater detail than others. This course assumes some familiarity with material from discrete mathematics, data structures, as well as sorting and graph algorithms.  

Coursework: Your grade will be determined as follows:  

a. Homework: 55% Bi- or tri- weekly homework consisting of several problems.  
b. Midterm exam: 20% An 80 minute test during class period on Thursday March 2.  
c. Final test: 25% A three hour, in-class test on Monday May 8, 9am–12pm.  

Grading policy: The Honor Code applies on all assignments (see individual details).  

Homeworks:  

• You may discuss the problems with your fellow students and the instructor, but the solutions and write-up must be yours. This means that looking at other students’ solutions or showing your solution to others constitutes violation of the honor code. In other words, after talking about a problem you leave the room with the hints or solutions in your head, not on paper.  
• You may not consult students outside this class.  
• You are encouraged to consult books, papers or other published material. However, you MUST reference any sources of ideas that led you to a solution.  
• You should not plagiarize. Therefore, you should write the solutions in your own words, even if the solution exists in a publication that you reference.  
• Explain the solutions as clearly, concisely, and (mathematically) rigorously as possible. I will take points off for unclear or verbose answers.  
• All assignments should be typed and submitted online through Blackboard.  
• Due to the relatively large time-frame between assignments, NO LATE assignments will be accepted. Exceptions can be made in special cases, but you need to notify the instructor in advance. HINT: Start working on the assignments early!
There may be a curve of the final grades, although the standard lower bounds are guaranteed, i.e., you will get a letter A if your grade is above 90, a letter B if it is above 80, etc.

**Course Syllabus:** The following topics will be covered in varying levels of detail:

- Growth of functions: sums and recurrences
- Analysis of algorithms: worst case, average case, lower bounds, amortization and application to disjoint sets
- Design of algorithms: greedy, divide and conquer, dynamic programming, randomized algorithms.
- Matrix and numerical operations: matrix multiplication, LU decomposition, polynomials
- Parallel Algorithms: PRAM, parallel prefix
- NP-Completeness

**References for Further Reading:**
- Sedgewick: Algorithms.
- Weiss: Data Structures and Algorithms Analysis.

**Students with disabilities:**
If you have a disability that may affect your participation in this course and wish to discuss academic accommodations, please contact me as soon as possible.