

Syllabus for CMSC 651: Advanced Algorithms

Overview: The goal of algorithms is to solve problems in the best possible way. In this course we will develop tools to solve problems quickly, and then use them. Hence we will MOTIVATE everything we do.

Where and When Class Meets: MWF 1-2 in CSI 2118

Topics: Since the class meets 3 times a week for 15 weeks, there are roughly 45 lectures (this is not exact because of labor day and exam review days). The estimates on how long we will spend on each topic are approximations.

1. Using Data Structures to Speed up Algorithms. For example, Fib Heaps are used to speed up Min Spanning Tree algorithms. Will use amortized analysis (6 lectures)
2. Minimal Spanning Trees. (3 lectures)
3. Bipartite and General Matchings. (5 lectures)
4. Network Flows. (5 lectures)
5. NP Completeness (7 lectures)
6. Linear Programming and Primal-Dual Methods. (5 lectures)
7. Fixed Parameter Tractability. (7 lectures)
8. Approximation algorithms (5 lectures)
9. There may be a few guest lectures on topics to be named later.

Grading: There will be HW roughly once every two weeks, one midterm, and one final. HW is worth 25%, midterm is worth 30%, and final is worth 45%. THE FIRST MIDTERM WILL BE WED NOV 1 7:00-9:00PM (at night, not in class). For the HW and the midterm you must hand in your own work— academic dishonesty will be dealt with harshly, resulting in a hearing in front of the academic honor council and an XF. HW must be *neatly* written. You can lose points on sloppyness.

More on the HW: For the written assignments you are **strongly recommended** to use LaTeX or some other math-friendly word processing language. (You can hand in hand-drawn diagrams when needed.) Some of the HW will be Oral Presentations done in groups of 2 or 3. More details on that will be forthcoming.

Text: No text has been assigned. We will be giving out notes.

Prerequisites: CMSC 451. This is a real prerequisite in that we will be drawing on knowledge of this material.

Teacher and TA: Dr. William Gasarch (gasarch@cs.umd.edu) is the teacher. Thomas Dubois is the TA.

Dr. Gasarch Info: Dr. Gasarch, Room: AVW 3213, Office Hours: MW 2-4 and by appointment. Phone (301) 405-2698.

TA Thomas Dubois Office Hours: Tuesday 12-2:00. In AVW 1112.

Lateness policy: HW is due at the BEGINNING of class. The only excuse that will suffice for an extension is a medical one that is documented.

Academic Accommodations: If you have a documented disability, you should contact Disability Support Services 0126 Shoemaker Hall. Each semester students with documented disabilities should apply to DSS for accommodation request forms which you can provide to your professors as proof of your eligibility for accommodations. Provide the professor with these documents as soon as possible. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site at <http://www.counseling.umd.edu/DSS/receivingserv.html>.

Religious Observances: The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs, students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is the responsibility of the student to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period. Faculty should further remind students that prior notification is especially important in connection with final exams, since failure to reschedule a final exam before the conclusion of the final examination period may result in loss of

credits during the semester. The problem is especially likely to arise when final exams are scheduled on Saturdays.

Academic integrity: The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studenthonorcouncil.umd.edu/whatis.html>

The University of Maryland is one of a small number of universities with a student-administered Honors Code and an Honors Pledge, available on the web at <http://www.jpo.umd.edu/aca/honorpledge.html>. The code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. The University Senate encourages instructors to ask students to write the following signed statement on each examination or assignment: "I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment)."

[Web page:] <http://www.cs.umd.edu/~gasarch/651/651.html>.