

# COP 4531/CGS 5427 — Analysis of Algorithms

Piyush Kumar

Handout #1, August 22, 2004 – Course Information

**Course Web Site.** <http://www.compgeom.com/~piyush/teach/4531/>

**Class Mailing List.** Announcements for the course, homeworks, reading assignments, programming projects will be available using the blackboard (<http://campus.fsu.edu>). Make sure you check both the course web site and the blackboard at least once in two-three days throughout the semester.

**Instructor.** Piyush Kumar.

URL: <http://www.compgeom.com/~piyush>.

Office Hours: Tuesday 5 pm - 6 pm, and Thursday 4 pm - 5 pm. I am also usually available in my office, and you can feel free to meet me in the afternoons, except before class Tuesday and Thursday. Alternatively, you may schedule an appointment, either by email or by phone.

Phone: 645-2355

Email: [piyush@acm.org](mailto:piyush@acm.org)

Venue: Office Hours will be held at Love 105B (My Office)

**Lectures.** Tuesday, Thursday 11:00-12:15pm; in Love 0301.

**TA.** TBA

**Exams.** *Midterms* are on Sep 28t and Nov 4th (at usual class timings). *The Final Exam is on Dec 10th*, Friday. 3:00pm to 5:00pm. All exams will be held in Love 0301.

**Course rationale:** Algorithms is a fascinating topic that is ubiquitous in computing. Algorithms are recipes for solving computational problems. This course aims at encouraging you to design efficient and clever solutions to problems that computer engineers and scientists attack in their day to day lives. The course also aims to teach you how to analyze the solutions you come up with (in terms of resources they use to solve the problem at hand), and to check if they are correct in a mathematically rigorous manner. This course involves understanding, creativity and analysis. I hope the course is an enjoyable learning experience.

**Course Description.** In this course we will study the design and analysis of algorithms to solve a wide variety of problems including sorting, searching and graph algorithms. We will cover various techniques that can be used to solve new problems you face, like divide-and-conquer, dynamic programming, greedy algorithms, randomized algorithms, approximation algorithms and distributed algorithms. With the understanding of these techniques and their analysis you would be ready to design your own algorithms for new problems.

**Learning Objectives.** The objective of this course is to encourage you to learn how to :

- design ‘new’ algorithms.
- analyze a given algorithm.
- read and understand algorithms published in journals.
- develop writing skills to present your own algorithms
- collaborate and work together with other people to design new algorithms.

**Prerequisites.** See the prerequisites handout. Grade of C- or better in COP 4530. STA 4442 and either MAD 3107 or MAD 3105.

**Textbooks.** Most algorithm textbooks cover a majority portion of the material we will be studying in this course. Roughly 80% of the material is covered in *Introduction to Algorithms* by Cormen, Leiserson, Rivest, and Stein. My lectures will often draw from the following (optional) texts.

1. Brassard and Bratley, *Fundamentals of Algorithmics*.
2. Scribe notes of Professor Michael Bender.
3. Robert Sedgewick, *Algorithms in C++*.
4. S. Skiena *The Algorithm Design Manual*.
5. Motwani and Raghavan, *Randomized Algorithms*. Cambridge University Press, 1995.

I have requested the above material (Except Michael's notes) to be put on reserve in the library. The text book is available at the FSU bookstore.

### Course Policies

1. **Homeworks:** The best way to learn the material is by solving problems. You are encouraged to work in pairs, because the best way to understand the subtleties of the homework problems is to argue about the answers. Each of you should look at all the problems independently, and not just divide the list in two parts each time. Don't be a leech and let your partner do all the work. Unless you learn how to solve problems, I *promise* that you will get burned on the exams and thus for your final grade.
2. The partner system relies upon a certain maturity among the students. If you don't have a partner, tell me and I will try to hook you up with one. If you are having trouble with your partner and want a divorce, tell me and I will set you up with a new one. I will act as a broker *but not* as a counselor. I do not want to hear what a louse your old partner is, and you will get a dirty look from me when you demand a divorce regardless of who was at fault.
3. Both solutions should be handed in *Stapled together*. Only the top solution will be graded. Indicate properly which one you want graded.
4. Your solutions should be *very neatly written*. If your solution is unclear, sloppy, or if your solution is hard to understand, you will have points deducted even if your solution is correct. One of the best way to make your solutions clear is to *include pictures* and *examples*.
5. Homework assignments will be due at the *beginning of class* and I will hand out the solutions immediately. **Late assignments** *will not be accepted* because the solutions will be available.
6. It is extremely important that you *start homework assignments early*. The homeworks are very challenging, and if you get behind in your work, you may find it too difficult to catch up. I strongly encourage you to attend the office hours. This will almost certainly improve your performance in the course. Out of all the graded homework sets, I will drop the min score before calculating the total homework score towards the final grade. Since I drop the lowest score, missing one homework due to an illness should not be a problem.
7. If you ask to re-grade your homework please write out the basis of your request. If the grader finds no basis for your complaint, then 10% points will be taken off your original grade unless the grade is changed. This is not to say that we discourage you from disputing your grade, but rather we encourage you to read and understand the solutions to the homework (posted on the web) before complaining.
8. Short surprise quizzes will be given in class (without any announcement). There will be three quizzes in the entire semester out of which I will drop the minimum score and count only the top two scores towards the 6% weight of quizzes.
9. **Grading Criteria:** The grade for COP 4531 will be assigned based on the following approximate percentages.

	Approximate Percentage	Variable
Homework	20%	
Programming Assignment	4%	$h \in [0, 30]$
Quiz	6%	
Midterm 1	20%	
Midterm 2	20%	$f \in [0, 70]$
Final	30%	

**To Pass:**  $h \geq 16$  and  $f \geq 40$ .

**Final Grades:** Your final grades (letter grades) will depend on your  $(h + f) \in [0, 100]$  score. There is no pre-established scale or curve. I will sort all the  $(h + f)$  scores for those who pass and assign letter grades to different non-overlapping intervals (The highest level being A and decreasing thereof). I will at my discretion, use clustering to generate the intervals or the following intervals (Whichever yields you a *better* grade).

Percent	Letter	Percent	Letter	Percent	Letter	Percent	Letter
94-100	A+	84-87	B+	74-77	C+	64-67	D+
90-93	A	80-83	B	70-73	C	60-63	D
88-89	A-	78-79	B-	68-69	C-	57-59	D-
0-56	F						

10. I reserve the right to modify these numbers uniformly by 5% each. I reserve the right to de-emphasize the homework grades if there is evidence of students who copy instead of doing the homework themselves.
11. Scribing will be worth *approximately* 3 or 4 percentage points of extra credit (This option is only for people who know L<sup>A</sup>T<sub>E</sub>X and XFig or are willing to put the effort to learn it).
12. **Missed exam Policy:** A missed exam will be recorded as a grade of zero. We will follow the university rules regarding missed final exams (see [http://registrar.fsu.edu/dir\\_class/fall/exam\\_schedule.htm](http://registrar.fsu.edu/dir_class/fall/exam_schedule.htm)), for all the exams, including the final exam.
13. **Grade of 'I' Policy:** The grade of 'I' will be assigned only under the following exceptional circumstances:
  - The final exam is missed with an accepted excuse for the absence. In this case, the final exam must be made up during the first two weeks of the following semester.
  - Due to an extended illness or other extraordinary circumstance, with appropriate documentation, the student is unable to participate in class for an extended period. In this case, arrangements must be made to make up the missed portion of the course prior to the end of the next semester.
14. **Academic Honor Code:** Because a primary goal of the course is to teach professionalism, any academic dishonesty will be viewed as evidence that this goal has not been achieved, and will be grounded for receiving a grade of F (You must read the FSU Academic Honor Code in the Student Handbook and abide by it). Copying/Modifying other people's programs/code will be treated the same as copying in an exam.
  - Every student must write his/her own code and homework. Showing your code or homework to members of other teams, giving it to them, or making it accessible to them (e.g., by making the files world-readable) is academic dishonesty.
  - You are responsible for ensuring that your code/documentation/results/homeworks are adequately protected and not accessible to others. Change permissions of your working directory to 0700 (`chmod 0700 {directory}`).
  - Consulting code from a textbook, or from the Internet, in order to understand specific aspects of your assignment is fine. However, *copying entire code or large parts of such code will be considered academic dishonesty*. If you borrow small parts of code from these sources, you must acknowledge this in your submission and additionally you must clearly understand and be able to explain how the code works.Once again: There is no excuse for cheating in any circumstances. See me before you even *contemplate* cheating.
15. **Accommodation for Disabilities:** If you have a physical, psychological, medical or learning disability that may impact on your ability to carry out assigned course work, I would urge that you contact the staff in the Student Disability Center and bring a letter to the instructor indicating the need for accommodation. The Student Disability Resource Center will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential. They can be contacted at (850) 644-9566.
16. **Attendance Policy:** The university requires attendance in all classes, and it is also important to your learning. The attendance record may be provided to deans who request it. If your grade is just a little below the cutoff for a higher grade, your attendance will be one of the factors that we consider, in deciding whether to "bump" you up to the higher grade. Missing three or fewer lectures will be considered good attendance. In rare cases, such as medical needs or jury duty, absences may be excused with appropriate documentation. You should let me know in advance, when possible, and submit the documentation I seek. You should make up for any materials missed due to absences.
17. **Syllabus Change Policy:** The syllabus is guide to the course and subject to change with advanced notice.