

# CSE 331, Introduction to Algorithm Analysis and Design

## FALL 2009

Mon Wed Fri 1:00-1:50pm, NSC 205

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- It is **your responsibility** to make sure you read and understand the contents of this syllabus. If you have any questions, please contact the instructor.
  - Please complete the anonymous feedback form. Filling up the form is optional but I encourage you to fill at least the part about your preferred office hours.
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### Instructor information

Atri Rudra (<http://www.cse.buffalo.edu/~atri>)

- *Email:* atri "at" buffalo "dot" edu
- *Office:* CSE 123
- *Phone:* 645-3180 x 117 (Will change during Fall 2009)
- *Office Hours:* Wednesday 11:00-11:50am and Friday 2:00-2:50pm

It is preferable to set up an appointment if you want to talk to me outside of my office hours. However, you can drop by if my office door is open.

### TA information

Jeff Delmerico

- *Email:* jad12 "at" buffalo "dot" edu
- *Office:* Commons 19 (CSE suite)
- *Office Hours:* Wednesday noon-12:50pm

### Recitations

You should have signed up for one these three recitation sections:

- Mondays, 9:00-9:50am (120 Baldy)
- Mondays, 11:00-11:50am (213 Norton)
- Tuesdays 8:00-8:50am (260 Capen)

Attending the recitations is important, as it will cover material that could not be covered well in the lecture due to time constraints and/or discuss homework problems (and their solutions once the homeworks have been turned in). Also the recitations will provide an opportunity to ask your questions in a smaller gathering.

## Course Description

*(From the course catalog)*

Introduces methods for algorithm design, paradigms such as divide and conquer, greedy, and dynamic programming, and techniques for algorithm analysis, such as asymptotic notations and estimates, as well as time/space tradeoffs. Topics include sorting, searching, scheduling, string matching, graph algorithms, computational geometry, and more.

## Pre-requisites

Data Structures (CSE 250) and College Calculus II (MTH 142).

## References

We will be using the following textbook:

Jon Kleinberg and Éva Tardos, “Algorithm Design.” Addison Wesley, 2005.

Occasionally, we will study topics that are not covered in the textbook. In such cases, supplementary material will be provided.

The following textbooks are useful references:

Thomas S. Cormen, Charles E. Leiserson, Ronald Rivest, and Clifford Stein, “Introduction to Algorithms (2nd Ed).” MIT Press, 2001.

Donald Knuth, “The Art of Computer Programming Volumes 1, 2, 3, 4.” Addison Wesley.

Alfred V. Aho John E. Hopcroft and Jeffrey Ullman, “Data Structures and Algorithms.” Addison Wesley, 1983.

## Schedule

We will have roughly 13 weeks worth of classes. Here is a tentative list of topics that we will cover (KT refers to the textbook):

- Introduction [KT, Chap 1] (1 week).
- Asymptotic Analysis [KT, Chap 2] (1 week).
- Graph Basics [KT, Chap 3] (1 week).
- Greedy Algorithms [KT, Chap 4] (3 weeks).
- Divide and Conquer Algorithms [KT, Chap 5] (3 weeks).
- Dynamic Programming [KT, Chap 6] (4 weeks).
- NP-completeness and other advanced topics [KT, Chap 8] (1 week).

A more detailed schedule will appear at <http://www.cse.buffalo.edu/atri/courses/331/schedule.html>

## Class Webpage

<http://www.cse.buffalo.edu/~atri/courses/331/>

## Course Blog

We will be using a blog (<http://cse331.wordpress.com>) for the course in lieu of a course newsgroup. All announcements will be made on the blog. If you are attending the course, you **must** check the blog regularly (and consider subscribing to the RSS feed via the link on the blog). These announcements would include the ones that inform if and when classes/office hours are re-scheduled etc.

Usually, the instructor and the TA will be the only ones who will write the blog entries. There will be an entry for each lecture and homework. (More on the blog posts on lectures in a bit.) You are encouraged to use the comments section to post questions and/or comments. Sometimes, the blog may include side comments or stories that I feel are relevant to the course (but are not directly related to the lectures).

## Grading Policy

Here is the split of grades:

- Blog post (5%)
- Homeworks (30%)
- Mid-term exam (25%)
- Final exam (40%)

See the next few sections for more details on each of the above components.

## Blog post

You are required to write a blog post on one of the lectures during the course (after the first week). I'll post entries for the first three lectures to give you an idea of how to write such posts. In general, it should be a summary of what was covered in the lecture and your comments on the lecture (if any).

Your posts are due by 5pm the day before the next lecture (i.e. by 5pm on Tuesday, Thursday and Sunday for the Monday, Wednesday and Friday lectures respectively). There are more students than lectures, so for some lectures there will be two guest bloggers. You can choose the lecture date that works best for you—the slots will be allotted on a first-come-first-serve basis. To do so, send email to `atri "at" buffalo "dot" edu` with your first five preferences. (The course webpage will maintain the assignments.) If no one signs up for a particular lecture, then I will pick a student who has not volunteered at random at the beginning of the lecture. If the chosen student is not present, then the student will get a 0 for the blog post part of the grade.

## Homeworks

Homeworks will be generally handed out on Fridays in class and will be due in class before the *start* of the next lecture on Friday. There will be **10** homeworks (I reserve the right to increase or decrease the number of homeworks). **No late submission** will be accepted. However, the lowest score on your homeworks will be dropped.

Unless mentioned otherwise, collaboration is allowed on the homeworks, subject to the following conditions:

- You are allowed to collaborate provided you have thought about **each problem for at least 30 minutes on your own**. This will help you in the exams.

- You can collaborate on any homework in a **group of size at most 3**, including yourself. Note that you cannot collaborate with different groups for different problems. You must write the name of *everyone* in your group on your submission.
- Your submitted homework must be **written in your own words**. In other words, the collaboration is only allowed up to the extent of discussing ideas– the writing has to be done individually. In particular, at no point of time should you have in your possession the written homework of someone else.

The line between collaboration and cheating can be blurry– when in doubt, play safe. Not only is cheating bad in principle, in practice it is highly unlikely that you’ll do well in the exams unless you have worked hard on the homeworks on your own. It is highly recommended that you do not try to test my claim out on yourself.

## Mid-term exam

There will be an in-class exam on **Friday, October 16** in the usual meeting place and time. The exam will be closed book and notes. However, you can bring in a single 8.5x11 inch handwritten paper (you can use both sides).

## Final exam

The final exam will be held at a place and time fixed by the university. Again the exam will be closed book and notes but you can bring in *two* 8.5x11 inch handwritten sheets.

## Miscellaneous Notes

No make-up exams/homeworks extensions will be given unless in provably extraordinary circumstances. Please plan your travel with the exam dates in mind. Your grade will solely depend on your performance in this semester: you will not get any opportunity to do extra work to improve your grade. It is your duty to make sure you understand what is expected of you. This course will require a fair bit of work so if you are busy this semester, please plan accordingly.

If there is a genuine reason for re-grading, please contact the person who graded your homework/exam within *a week* of when the graded material is handed out in class. In particular, if you do not pick up your graded material on time, you lose the opportunity to get back to us within the stipulated time period.

## Disabilities

If you have a diagnosed disability (physical, learning, or psychological) that will make it difficult for you to carry out the course work as outlined, or that requires accommodations such as recruiting note-takers, readers, or extended time on exams or assignments, you must consult with the Office of Disability Services (25 Capen Hall, Tel: 645-2608, TTY: 645-2616, Fax: 645-3116, <http://www.student-affairs.buffalo.edu/ods/>).

You must advise your instructor during the first two weeks of the course so that we may review possible arrangements for reasonable accommodations.

## Academic Honesty

I will follow the CSE department academic integrity policy. Details can be found at [http://www.cse.buffalo.edu/undergrad/current\\_students/policy\\_academic.php](http://www.cse.buffalo.edu/undergrad/current_students/policy_academic.php)

Again, it is **your responsibility** to make sure you understand the rules. I have zero tolerance for cheating: you will be a **minimum** of 0 in the particular homework/exam. You could get an F for the entire course even for your first cheating attempt. If the misconduct were severe then I would start the procedure for

harsher sanctions including an F grade with an academic dishonesty citation on your transcript or expulsion from the University.

## **Suggestions or Comments?**

I would be happy to get feedback from you. You can either

- Talk/send email to the instructor, or
- Use the comments section of the entries in the course blog, or
- Fill in the feedback forms that will be handed periodically in class.