CS 321 – Algorithms
Syllabus – Fall 2012

INSTRUCTOR: Tom Naps

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OFFICE HOURS: Tues and Thurs, 9:00 - noon

REFERENCES:

- Daily class handouts. Organize them, take notes on and about them. Handouts that are not liberally supplemented with your own explanatory notes will likely prove useless when you need them most.
- Course Web page at `http://csf11.acs.uwosh.edu/moodle`. If you haven't already created an account at this moodle, you will need to do so. Then when you login to this page, use the enrollment key *turing* to enroll in this course.
- *Introduction to Algorithms*, 2nd edition by Cormen, Leiserson, Rivest, Stein. MIT Press.
  Not required but the primary source of information for much of what you will see in this course and a great "bible" for anyone who may have to prepare for a coding interview – see:
  https://sites.google.com/site/nyocoachingsessions/technical-interview-resources

Topic Coverage

1. Analysis of algorithms:
   (a) Efficiency
   (b) Correctness
2. Algorithm design strategies
   (a) Divide-and-conquer
   (b) Dynamic programming
   (c) Greedy algorithms
   (d) Brute-force
   (e) Backtracking
   (f) Randomization
   (g) Approximation
3. Algorithms from specific problem domains including:
   (a) Graph algorithms
   (b) Numerical algorithms
      i. Number theory
      ii. Geometry
   (c) Data integrity, authentication, and encryption
   (d) Pattern matching
   (e) Parallel algorithms

Course Grading Policies

Your grade for the course will be based on the following weighted factors:

Factor	**Weight**
Class participation and preparation	15%
Assignments	45%
Exams	40%

There will be four exams during the semester. Tentatively dates for them are . . . :

- September 24
- October 26
- November 26
- December 14

Your worst exam grade will be thrown out in determining the 40% exam contribution to your grade.

At the end of the term, your work in all of these areas will contribute to a numerical grade for the course based on a 100-point scale. Grade cutoff levels on this final scale are:

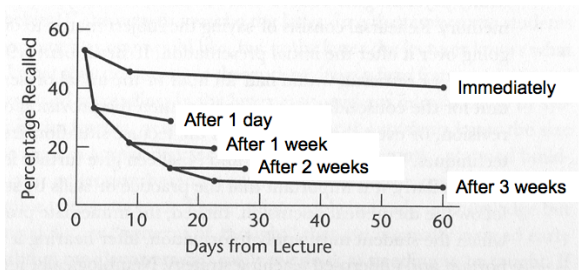
A $\geq$ 92	B $\geq$ 82	C $\geq$ 72	D $\geq$ 62
A- $\geq$ 90	B- $\geq$ 80	C- $\geq$ 70	D- $\geq$ 60
B+ $\geq$ 88	C+ $\geq$ 78	D+ $\geq$ 68	F $<$ 60

FAQ

Do I have to come to class? You are expected to arrive prepared to ALL the course sessions. Furthermore you are expected to participate in the classroom discussions and activities to the best of your abilities. This includes being ready to defend your answer to the review problems from the previous class (more on that later). It is difficult to envision a student missing and/or arriving unprepared to a number of the class sessions and still succeeding in the course.

How much time will this course take? Figure about three hours outside of class for each hour in class. That heuristic makes being a full-time student pretty much equivalent to holding a full-time job, so this is really good preparation for the real world that awaits you after graduation.

How can I best prepare for the exams? We've known what the following graph illustrates since 1968:



Bassey M. (1968), in *Learning methods in tertiary education*

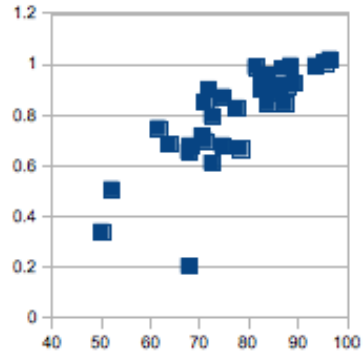
More interesting evidence ...

> "Research has demonstrated that after a lecture, students recall 62% of the information. However, only 45% is recalled by students after 3-4 days and in 8 weeks only 24% of the information is recalled. If a quiz or exam was administered after the lecture, recall was doubled at the 8-week period. It is interesting that many faculty members appear to ignore the potential impact which quizzes and tests can have upon learning." – Bonwell C.C., Eison J.A.: Active Learning: Creating Excitement in the Classroom. Washington, DC: George Washington University, 1991.

Consequently at the end of most of our class periods I will give you one or more exam review problems. The time to work on these review problems is immediately after the material is covered in class. If you have participated in class the day the review problem was distributed, have made a good faith effort to work on the review problem, and are "stuck" on it, I will be more than happy to help you with it if you come my office anytime within three days after you have received the review problem in class.

After those three days (not counting weekends), *because you have made the choice to not learn effectively*, you are on your own in terms of grappling with these review problems.

Although the review problems only count 15% of your grade, the following correlation between review-problem-percentage (on a 0 to 1.0 vertical scale) and overall percent in the course (on a horizontal scale of 0 to 100) is indicative of their true importance.



What if I'm late in submitting a lab/assignment for evaluation? Each lab and assignment will carry with it a due date. If you are late in submitting it for evaluation, it will be accepted but will be penalized at the rate of 10% of point value the first day late, *an additional* 20% the second, *an additional* 30% the third ...

Is there any way I can carelessly lose points in the course? Yes ...

- Be late in submitting your work for evaluation on assignments.
- Don't participate in and prepare for the class.

What is this class participation/preparation stuff? How does it add up to 15% of my grade? ...

- Be sure to do those review problems before the next class meeting. If you do that and get them right, you get full credit for them. If you do that but get them wrong, you get half credit. If you don't do them, you get no credit.
- Exhibit your knowledge when called on to explain your correct answer to a review problem.
- Exhibit your knowledge when called on to respond to other questions in class

Is there any way I can get some bonus points? ...

- Do an outstanding job when called on to explain your correct answer to a review problem.
- Enroll in CS 314 and participate in the ACM Programming Contest on Saturday, November 3 – you will receive an additional $\frac{1}{2}$ point on the 100-point grading scale for each problem that your team of three solves during the contest.

Can I get an extension on work that is due on a specified date? Only if you're ill enough to provide a signed note from the attending physician or have other reasons serious enough that the Dean of Students Office is willing to provide a written note justifying the extension.

If I miss a test, can I make it up? If you are unable to take a scheduled exam, it may be possible to take a make-up exam provided that you do BOTH of the following, which are then subject to my approval:

- Make arrangements prior to the scheduled exam (for last minute emergencies, telephone me at 424-1388 or leave a message at the computer science office, 424-2068). No after-the-fact notifications will be accepted ... *AND*
- Have a written medical excuse signed by the attending physician OR have a note of justification from the Dean of Students Office.

Only one make-up exam will be given. It will be a rigorous comprehensive exam given at an arranged time during the last week of the semester.

Can I work with others on assignments? No, not in the sense of two people working on the same program. However, it is acceptable to consult another student for help in debugging a program that you have authored yourself and that is not producing the result you expected. It is also acceptable to cut-and-paste code snippets from in-class demos or examples you find on the internet *provided* that you cite the sources of these code snippets in the introductory documentation block at the beginning of your program.