CSC721 Fall 2007
Algorithms

Professor: Torgersen
Office Phone: 758-5536
Office Hours: Monday and Wednesday 3:00 to 4:00 and by appointment.

Goals:

1. Overview of Algorithm design strategies
   (a) Divide and conquer / Balancing
   (b) Backtracking
   (c) Greedy algorithms
   (d) Dynamic Programming

2. Review of Complexity
   (a) Asymptotic measures

3. Commonly used algorithms for important problems.
   (a) Pattern matching.
   (b) Union-Find problem
   (c) Graph Algorithms, minimal spanning tree, shortest paths, etc
   (d) Data Compression (if time allows)
   (e) The Fast Fourier Transform and applications. 2-D FFT.
   (f) Matrix multiplication and related problems
   (g) LUP decomposition
   (h) Newton’s method, Quasi-Newton type methods, (if time allows)
   (i) Large integer multiplication
   (j) Modular arithmetic and Chinese remaindering

4. The Classes $\mathcal{P}$ and $\mathcal{NP}$, $\mathcal{NP}$-complete problems

5. Correctness proofs and time complexity analysis

Expectations:

1. Class participation.
2. Communicate if things get complicated.
3. Your best effort.

Grading:
Two exams (50%), a few programming assignments (15%), as many take home problem sets as we can produce (35%). Programming assignment(s) must be submitted ready to compile and run under either Linux (standard laptop load) or the CS department Sun workstations.

Disability Notice:
If you have a disability that may require an accommodation for taking this course, then please contact the Learning Assistance Center (758-5929) within the first two weeks of the semester.

Pandemic Planning Notice:
The University has requested that faculty collect personal contact information as part of emergency planning and preparation. The information you provide is strictly confidential.