

**CIS 435: Advanced Data Structures and Algorithms**  
**Spring 2002**  
**Basic Course Information**

**Instructor:** Prof. Joseph Leung, GITC 4310, leung@cis.njit.edu, 973-596-3387.

**Prerequisites:** CIS 114 or CIS 335.

**Textbook:** *Introduction to Algorithms* by Cormen, Leiserson, and Rivest (MIT Press and McGraw Hill).

This is a large book, covering a wide range of topics of which we will only cover a portion. The book should prove useful to you later as a reference.

**Topics:**

- Introduction.
- Growth of functions.
- Solving recurrences.
- Heapsort.
- Quicksort.
- Counting sort, bucket sort.
- Selection, priority queues.
- Hashing.
- Binary search trees.
- Red-black trees.
- Augmenting data structures.
- Disjoint-set data structures.
- Midterm review.
- Midterm exam.
- Breadth-first and depth-first search.

- Minimum spanning trees.
- Cryptography.
- Computational geometry.
- Single source shortest paths.
- All-pairs shortest paths.
- P and NP.
- Final review.

**Slides:** A set of lecture slides (developed by Professor Dina Kravets) is available on the class web page (<http://web.njit.edu/leung>).

**Grading:** There will be weekly homework assignments as well as a midterm and final exam (closed-book). The problem sets will count for 20% of the final grade, the midterm 35%, and the final 45%. If there is a large discrepancy between your homework and exam grades, the grades will be balanced at our discretion.

While you may find it helpful to discuss (in general terms) homework problems with colleagues, the work you turn in must be your own.

Homework turned in late will not count toward the grade.

The following are the problem sets (tentative) with due dates. All problems are from the textbook.

PS #	Due Date	Problems
1	Feb. 5	1.2-2, 1.3-3, 1.3-5, 2-3 (first 3 columns)
2	Feb. 12	4-1, 7.1-1, 7.3-3, 7.4-2
3	Feb. 19	8.1-3, 8.2-2, 9.2-5, 9.3-2
4	Feb. 26	10.2-3, 10.3-7, 11-1, 12.2-3, 12.3-1
5	Mar. 5	13.2-1, 13.3-1, 14.1-3, 14.3-4
6	Mar. 12	15.2-2, 15.3-4, 22.1-3, 22.2-2
Midterm	Mar. 16	Covers problem sets 1-6
7	Apr. 2	17.1-2, 17.3-4
8	Apr. 9	16.1-2, 16.2-2, 17.2-3, 17.2-4, 23.1-3
9	Apr. 16	23.2-4, 23.3-6, 24.1-1, 24.2-2
10	Apr. 23	24.2-4, 25.1-2, 25.2-3, 25-3
11	Apr. 30	26.2-4
12	May 7	36.2-6, 36.2-7, 33.7-1