Syllabus: CS 4104
Data and Algorithm Analysis
Spring, 2005

Instructor: Lenwood S. Heath

- **Office:** 2160J Torgersen Hall
- **Office Hours:** 3:30–5:00 Tuesdays; 10:30–noon Wednesdays
- **Email:** `heath@vt.edu`

Graduate Teaching Assistant: Seonho Kim

- **Office Hours:** Place and time to be announced on the course web site
- **Email:** `shk@vt.edu`

Course Online:

- **Course Web Site:** `http://courses.cs.vt.edu/~cs4104/heath/Spring2005/index.php`
- **Blackboard (Course Grades Only):** `https://learn.vt.edu/`
- **Class Listserv:** `CS4104_11536@listserv.vt.edu`

Class Meets: Norris 204, 9:30–10:45 AM; Tuesdays and Thursdays

Exams:

Midterm Exam	Thursday, March 3, 9:30–10:45
Final Exam	Saturday, Saturday, May 7, 10:05–12:05

CRN: 11536

Prerequisites:

- CS 2604, Data Structures and File Management
- MATH 3134, Applied Combinatorics and Graph Theory, or MATH 3124, Modern Algebra

Textbook:

- **Required:** *Introduction to Algorithms (Second Edition),* Cormen, Leiserson, Rivest, and Stein; MIT Press, 2001; ISBN: 0262032937

Description

This course emphasizes techniques for constructing efficient algorithms and techniques for analyzing the efficiency of an algorithm. The notion of a *problem* is defined. Problems in a number of application areas are covered. Lower bounds on the efficiency of solving a problem are also addressed, especially the notion of NP-completeness.

Grading Policy

Grading for the course is on a 1000-point scale, with the points distributed as follows:

Homework assignments: 10 at about 60 points each	600
Midterm exam: March 3, 9:30–10:45	150
Final exam: Saturday, May 7, 10:05–12:05	250

A typical homework assignment consists of 2 or 3 problems or exercises, posted on the web site. All homework must be prepared with LaTeX or other word processing system and submitted as a stapled printout to a place to be specified on the assignment. Homework is due at 4:00 PM on the due date (see course calendar). **No late homework will be accepted.**

Readings

For most weeks, there is a reading assignment (see Course Schedule) to be completed by class time Tuesday morning. Each assignment consists of sections or chapters in the text.

Ethics

The Honor Code applies. All work submitted must be the student's own work. Students may solicit help only from the instructor or the GTA.

Announcement

If any student needs special accommodations because of a disability, please contact the instructor during the first week of classes.

COURSE SCHEDULE

DATE	SIGNIFICANT EVENT	TOPICS[1]
1/18	Read Chapters 1 and 2; Appendices A and B	**Overview** — Problems, Complexity, Analysis — and **Review** — Sets, Summations, Relations, Functions, Graphs
1/25	Read Chapter 3; Sections 4.1–4.3; Appendix C.1-C.4	Asymptotics; Recurrences; Review Discrete Probability
2/1	Read Chapter 11	Hashing
2/8	Read Chapter 15	Dynamic Programming
2/15		Dynamic Programming
2/22	Read Sections 16.1–16.3	Greedy Algorithms
3/1	Read Section 22.1	Graph Representation
3/3	Midterm Exam—9:30–10:45	
3/7–11	Spring Break	
3/15	Read Sections 22.2-22.4	Breadth-First Search; Depth-First Search; Topological Sort
3/22	Read Chapter 23	Minimum Spanning Trees
3/29	Read Chapter 24	Single-Source Shortest Paths
4/5	Read Chapter 25	All-Pairs Shortest Paths
4/12		All-Pairs Shortest Paths
4/19	Read Sections 34.1–34.3	Polynomial Time and NP-Completeness
4/26	Read Sections 34.4–34.5	Proving NP-Completeness
5/3	Last Day of Class	Discussion and review for final
5/7	Final Exam—10:05–12:05	

[1]Timing of lecture topics is approximate.

End of Syllabus