COMP 163: Discrete Structures (Section 001)  
Fall 2006 Course Information & Syllabus

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Sometimes lecture notes or a summary may be available on the web. Other than that, if you have to miss a class, get notes from another student; mine are typically pieced together from more than one place with a lot of metacomment, which makes it hard for anybody but me to follow them. Also get copies of any missed handouts (available on the web site). The handouts are numbered sequentially, starting with handout 0. On handout 0, you need to fill in some information and return it to me promptly so you can be on the email list and get access to the web site for the course.

Office Hours: In DH-225: 11:15am–12:30pm on Monday and Wednesday.  
These are the guaranteed times to find me except as announced in advance. You should also feel free to look for me at other times or make appointments.

Course Objectives: This course covers elements of discrete mathematics relevant to the design of computer hardware and software and especially to the design and analysis of algorithms. Topics to be covered include logic, sets, functions, relations, induction, modular arithmetic, elementary combinatorics, graphs and trees, elementary probability, boolean algebra, and finite-state machines. We will also cover asymptotic notation and recurrences and use these tools to analyze a few algorithms for fundamental computing tasks.

Prerequisites: None (but facility with basic high school mathematics is expected).


Course Requirements: There will be several homework assignments, four tests, and a final. The weightings within the semester grade will be: Homework: 22%, Tests 1–4: 12% each, and Final exam: 30%.

Homework: Only homework turned in by the due date is guaranteed to be graded. Any special circumstances that cause difficulty in meeting the deadlines should be brought to the attention of the instructor in advance. Homework must be handed in at the beginning of class, since solutions may be discussed in the same class on occasion. Homework turned in to my mailbox will generally not be graded, since I do not check the box continually and cannot generally verify that homework was turned in before solutions were discussed in class. If you cannot turn in homework in person, you should put it under the door of DH-225.

Exams: The schedule tentatively calls for four 50 minute tests in week 4, week 6, week 9, and week 13. The final exam is scheduled for 9:00-11:00 am on Wednesday, December 13.

Collaboration: No collaboration is permitted on exams. Collaboration on homework is acceptable, but copying is not! (Safeguard your files and printouts.) You may discuss solution techniques with other students, but you must write up your solutions independently. If you obtain a solution through research, e.g., in the library, credit your source and write up the solution in your own words.
Tentative Course Outline and Approximate Schedule:

Recommended readings from the text are shown on a weekly basis. (When selected sections or subsections are listed, it is assumed that you will include the introduction of the corresponding chapter or section.)

2. (9/6) Induction. Sections 1.7–8.
3. (9/11) Sets, sequences, relations. Sections 2.1, 2.3, and 3.1–2.
4. (9/18) Exam I on Chapter 1. Functions, modular arithmetic, decimal error detection. Section 2.2 and supplementary material.
8. (10/16) Binomial coefficients, pigeonhole principle. Sections 6.7–8
10. (10/30) Solving recurrence relations. Sections 7.1–2.
11. (11/6) Recurrence solving and applications to analysis of algorithms. Section 7.3.
15. (12/4) Finite-state machines, Turing machines, undecidability of the halting problem. Sections 12.1–2 and supplementary material.
Core Learning Outcomes:

This course contributes towards the following QUANTITATIVE ANALYSIS Knowledge Area Learning Objectives:

- Represent and interpret quantitative information symbolically, graphically, numerically, verbally, and in written form.
- Recognize the limitations of mathematical and statistical models.
- Develop an understanding of the nature and history of mathematics, its role in scientific inquiry and technological progress, and its importance in dealing with issues in the public realm.
- Develop an understanding of the rudiments of statistics, including sampling and hypothesis testing, and the uses of statistical reasoning in everyday life.

This course supports the following Skill Area Learning Objectives:

QUANTITATIVE AND QUALITATIVE ANALYSIS AND RESEARCH METHODS

- Represent and interpret quantitative information symbolically, graphically, numerically, verbally, and in written form.
- Recognize the power and limitations of mathematical and statistical models.
- Develop an understanding of the nature and history of mathematics, its role in scientific inquiry and technological progress, and its importance in dealing with issues in the public realm.
- Develop an understanding of the rudiments of statistics, including sampling and hypothesis testing, and the uses of statistical reasoning in everyday life.

TECHNOLOGICAL LITERACY

- Demonstrate knowledge of the operation, application, and limitations of technologies important to his/her discipline.
- Select tools of technology appropriately in decision-making or to solve a problem.

CRITICAL THINKING SKILLS AND DISPOSITIONS

- Analyze relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express beliefs, judgments, experience, reasons, information, or opinions.