COMP 388: Foundations of Computer Science (Section 033)
Spring 2002 Course Information & Syllabus

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Lectures: Monday and Wednesday 11:30 am – 12:45 pm in DH-441.
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 metacomments, 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 Damen 329C: Mon. and Wed. 9–10 am and 2–3 pm, and Tues. 10:30–12:00.
These are the guaranteed times to find me except as announced in advance. You should also be able to find
me at lots of other times; feel free to look for me or make appointments.

Course Objectives: This course will provide graduate students with accelerated coverage of key topics
in discrete mathematics (COMP 211) and algorithms (COMP 363) to prepare them for graduate courses
in computer science. We will make a rapid passage through such topics as 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 some algorithms for fundamental computing tasks such as sorting, searching in ordered data
sets, and finding paths (or distances) in graphs.

Prerequisites: One semester of calculus (Math 161) and Structured Programming and Data Structures
(Comp 271).


Course Requirements: There will be several homework assignments, two midterm exams, and a final.
The weightings within the semester grade will be: Homework 20%, Exam I 25%, Exam II 20%, and Final
exam 35%.

Homework: Only homework turned in by the due date is guaranteed to be graded. Any special circum-
stances 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 handed out 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
distributed or discussed in class. If you cannot turn in homework in person, you should put it under the
doors of my office.

Exams: The midterm exams, tentatively scheduled for session 13 and session 20, are 75 minutes long. The
final exam is scheduled for 10:20 am – 12:20 pm on Wednesday, May 1.

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 for each lecture. (When selected sections or subsections are listed, it is assumed that you will include the introduction of the corresponding chapter or section.)

1. (1/14) Administrivia, course overview.
2. (1/16) Propositional and predicate logic. Sections 12.2, 12.4, 12.8, 12.9, 14.2–4, 14.7
4. (1/28) Loop invariants in programs. Recursive definitions and functions. Sections 2.2, 2.5–7. Chapter 1 also contains desirable background.
6. (2/4) Functions and their properties, modular arithmetic. Section 7.7 and supplementation.
9. (2/13) Recurrences. Section 3.11.
10. (2/18) Assignments, permutations, combinations. Sections 4.2, 4.3 (to just before “How Long Does it Take to Sort?”), 4.4–5, 4.7 (up to just before “Distributing Distinguishable Objects”). Note: the section on “Distributing Distinguishable Objects” is erroneous, and the “Comparison of Counting Problems” may be confusing.
11. (2/20) Binomial coefficients, generalized permutations, pigeonhole principle, combining counting rules. Sections 4.5–6, 4.8, and some supplementation.
17. (3/20) Trees, especially binary. Binary tree traversals. Sections 5.2 and 5.6. Sections 5.3 and 5.4 are optional (containing the book's first discussion of tree traversals but for general trees).
26. (4/24) Finite state machines. Section 10.2 and a little supplementation. Possibly also regular expressions in Section 10.5.