

# Brief Syllabus of COSC 4301-04/5314-01, Summer II 2004

## Logic and Discrete Structure for Computer Science

Mon~Fri – 12:45~2:05 pm – Maes 107

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**Why this course:** It's not over exaggerating to say that the entire enterprize of computer science stems from the study of logic. Not only that writing programs itself is a logical process but that every useful theorem in computer science is an analytical result deducted from a few accepted axioms. In other words, no knowledge in computer science should be treated as an experimental result. (Well, the Church-Turing thesis is the only exception I can think of; but that thesis has deeply touched the limitation of our logical system.) Unfortunately, many students majoring in computer science do not think that way more or less due to the pressure of delivering results in time. Here what they might do: write a program, observe the program running, and claim their victory. We are not here to complain that the atmosphere of the current industry inclines young computer scientists to be more engineering minded. But we certainly feel that a graduate with CS degree should be able to analyze and explain their technical concept in a satisfactory way. Here what a decent programmer should do: write a program, analyze the program, and announce a proper domain of his/her program. Beside immediate applications, the bottom line is, as a science, to understand and explain the underlying theories that govern the computer. However, this course is not designed to teach you those theories (check the curriculum to see what are they). Instead, this course is designed to equip you necessary mathematical background so you can understand those theories in your future study. Also, you may encounter some abstract concepts from time to time which are understood by yourself in your intuition. In many cases, our intuition turns out wrong. You should learn in this course how to examine your intuition and present abstract concepts to your teachers, and your future bosses as well.

**Textbook:** *Discrete Structures, Logic, and Computability*, by James L. Hein, Jones and Bartlett Publishers, Inc. 2002, Second Edition.

**Topics:** We will try to cover most topics from Chapters 1 to 9 of the textbook.

**Examinations:** (400 points) One midterm and one Final; 200 points each.

**Homework:** (200 points) Practice and practice is the only way to build up your mathematical muscle. I will try to give you homework everyday. They will be graded by the grader; 10 points for each homework. To get full credit for the homework should be considered almost impossible, there's always room for improving your proof and argument – Aesthetic is the ultimate test; of course, we down to this point only if there is no technical error. However, there is an alternative way to receive full credit: Each problem of the homework on its due date needs a volunteer to write down his/her *complete* answer on the blackboard *before* I come to the class. I will spend 10 minutes or so to grade them and point out the mistakes, if any. The volunteer will get full credit on the homework. (Take turn!!)

**Attendance:** (Extra 50 points) Attendance will be taken impulsively.

**Grading Policy:** Accumulate your points and your grade is based on the following scheme.

Points	Grade	Points	Grade
500 ~ 600	A Excellent	240 ~ 359	C Passing
360 ~ 499	B Good	150 ~ 239	D Poor
		0 ~ 149	F Failure