CSci 2011H Syllabus (Draft)

Honors Discrete Structures of Computer Science

Meeting time and place:

- Lecture: 9:05-9:55 MWF, AmundH 240
- Recitation: #011 9:05-9:55 T, MechW 221

Instructor: TBA

TA(s): TBA

Text: Discrete Mathematics and its Applications, K.H. Rosen, McGraw-Hill, 7th edition.

Course description and role: CSci 2011H covers discrete mathematical techniques and structures used in computer science. This includes introductory logic, set theory, recursion, induction, combinatorics, algorithmic analysis, and graphs.

CSci 2011/2011H is a required course for CS and CompE majors, and is a prerequisite for most 4xxx and 5xxx-level CSci classes. The goal of 2011/2011H is to give students familiarity and skill with the fundamental structures, concepts, proof techniques, and problem solving approaches that play a critical role in both the theory and practice of computer science and computer engineering.

How this course differs from (the non-honors) CSci 2011: CSci 2011 and 2011H are similar in that both cover much of the same material. However, 2011H differs from 2011 in three ways:

1. 2011H covers some common material more quickly, which allows it to cover some material beyond what 2011 covers.
2. 2011H explores many topics in more depth than 2011 does.
3. 2011H will often use more of a problem-focused approach. Specifically, 2011H devotes more time to in-class exercises than 2011 does.

Expected Workload: The workload in CSci 2011H consists of weekly textbook reading (about 50 pages per week), weekly or biweekly written short problem assignments, weekly in-class exercises, and quizzes and exams (4 quizzes, 2 midterms, and one final exam for the semester). The expectation is this will take about eight hours per week outside of class. However, students might find it takes more or fewer hours, depending on their background, mathematical skills, etc.

Prerequisites: Math 1271, 1371 or 1571H.

What you should expect to learn from this course: Upon successful completion of the course students should be able to do the following:

- For each of the structures (e.g., graphs) or techniques (e.g., counting methods, proof techniques) discussed in class, students should be able to
  - define the basic terminology and use it correctly,
  - give an explanation of why it is important,
  - provide and discuss specific examples of its use,
  - be able to identify its important characteristics, as well as any variants or special cases,
  - perform the basic operations associated with it,
  - use it, when applicable, to analyze and solve problems.
- Given a problem, students should be able to
  - identify which structures and/or techniques could be useful in analyzing or solving the problem, and why,
  - modify or specialize structures or techniques to make them applicable to problems that are not amenable to straightforward use of the structure or technique,
  - present a clear, concise, logically accurate, and rigorous solution,
  - tell whether a purported solution or analysis is accurate.

Assignments, exams, and grading: There will be weekly or biweekly homework assignments, weekly in-class exercises, a number of quizzes, two midterms, and a final. Here are the relevant dates and how much each will contribute to your final grade.

Homework Assignments		30%
In-Class Quizzes	TBA	10%
Other In-class and Between-Class Work		10%
Midterm 1	TBA	10%
Midterm 2	TBA	15%
Final	Tues. May 14, 8-10am	25%

Please note the dates of the exams carefully. as make-ups will be given only under extreme circumstances.

Grading: Grading for this course is on an absolute scale, so that the performance of others in the class will not negatively affect your grade. Final grades will be assigned based the following scale:

93.0%	100.0%	A
90.0%	93.0%	A-
87.0%	90.0%	B+
83.0%	87.0%	B
80.0%	83.0%	B-
77.0%	80.0%	C+
73.0%	77.0%	C
70.0%	73.0%	C-
60.0%	70.0%	D+
50.0%	60.0%	D
0%	50.0%	F

Incompletes: will be given only in very rare instances when an unforeseeable event causes a student who has completed all the coursework to date to be unable to complete a small portion of the work (typically the final assignment or exam). Incompletes will not be awarded for foreseeable events including a heavy course load or a poorer-than-expected performance. Verifiable documentations must be provided for the incomplete to be granted, and arrangements for the incomplete should be made as soon as such an unforeseeable event is apparent.

Withdraws: You are free to withdraw from the class up to the end of the eighth week of classes. Withdrawing thereafter is up to the college, and is not automatic. If you are not doing as well as you had hoped in the course, and are considering withdrawing, please do so by the end of the eighth week.

Scholastic conduct: Cheating on assignments or exams is a serious offense, and will be dealt with as such. The amount of collaboration allowed on assignments will be explained in the assignment rules. In general, you are free to discuss the assignment with others, you must work out your own solution and write your own code. Copying answers (whether from another person, from the Internet, or from a printed work), or letting another person copy your answers is a serious situation and can result in failing the course. Here is some more detailed information about academic conduct. If you have any questions about what is and is not allowable in this class, please ask the course instructor.

Other: Please check your registration carefully for accuracy.

Course Outline: (This schedule may change as the course progresses.)

- Week 1: Foundations (Start Chapter 1 in text)
- Week 2: Quantifiers, methods of proof (Continue Chapter 1)
- Week 3: Basic Structures (Chapter 2)
- Week 4: Algorithms (Chapter 3)
- Week 5: Number Theory (Chapter 4)
- Week 6: Introduction and Recursion (Chapter 5)
- Week 7: Induction and recursion (Chapter 5). Midterm 1.
- Week 8: Counting (Chapter 6)
- Week 9: Counting, Probability (Chapters 6 and 7)
- Week 10: Advanced Counting (Chapter 8)
- Week 11: Relations (Chapter 9)
- Week 12: Graphs (Chapter 10)
- Week 13: Graphs (Chapter 10). Midterm 2.
- Week 14: Modeling Computation (Chapter 13)
- Week 15: Modeling Computation, Class Summary (Chapter 13)
- Finals week: Tuesday, May 14, 8-10am, Final Exam.