CS 311H: Discrete Math Honors

Logistical Information:

Instructor:	Işıl Dillig
Lecture time:	Tuesday, Thursday 2:00 pm - 3:15 pm
Lecture room:	GDC 1.304
Discussion sections:	Friday 1-2 pm (GDC 1.406) and Friday 2-3 pm (JGB 2.202)
Instructor e-mail:	isil@cs.utexas.edu
Instructor office hours:	Tuesday, Thursday 3:15-4:00 pm
TA #1:	Ben Mariano (bmariano@cs.utexas.edu), Office hours: Monday 9-11am (GDC 5.710B)
TA #2:	Maruth Goyal (maruth@utexas.edu), Office hours: Wednesday 2-4 pm (GDC 5.710B)
Prerequisites:	Admission to the CS Turing Scholars program
Textbook (optional):	Kenneth H. Rosen, Discrete Mathematics and Its Applications, 7th edition.
Course Webpage:	http://www.cs.utexas.edu/~idillig/cs311h/

Course Description:

This course covers elementary discrete mathematics for computer science. It emphasizes mathematical definitions, logical inference, and proof techniques. Topics include propositional logic, first-order logic, proof methods; sets, functions, relations; mathematical induction, recursion; elementary graph theory; basic complexity theory, recurrences. Please refer to the syllabus for a more detailed description.

Requirements and Grading:

- This course has **three** in-class exams. Each midterm will be closed-book, but you can bring up to three sheets of notes (``cheat sheets" written or typed by you) to the exam.
- Each midterm counts for 25% of your final grade.
- No make-up exams will be given (except in cases of documented medical emergencies).

- There will be weekly problem sets. These assignments do not involve any programming, and will help you better understand the material taught in the class as well as prepare you for the in-class exams. The problem sets collectively count for 25% of your final grade.
- There may be a curve of the final grades, although the lower bounds of the standard scale are guaranteed, i.e., you will get an A- or A if your grade is 90 or above, a B(-/+) if it is 80-89, etc.

Homework Policies:

- Each assignment is due at the beginning of class on the indicated date.
- Each homework should be done in accordance with the Honor Code .
- No late assignments will be accepted, but we will drop your lowest homework score for calculating final grades.
- Solutions to problems sets must be typeset using LaTeX .

Extra Credit:

- This class will have extra credit assignments that can help you boost your exam scores (by up to 10%).
- The extra credit assignments will involve doing machine-checked proofs in Coq , which you will learn about during discussion sections.
- You may find Benjamin Pierce's textbook Software Foundations: Volume 1 helpful in doing these extra credit assignments.
- The extra credit assignments can be submitted **any time** before December 5.

Discussion Forum:

While the instructor and TAs are happy to answer your questions, we believe your peers will be an equally important resource in this course. Therefore, we encourage you to subscribe to our class piazza page. While you are welcome to discuss any high-level concepts, you may not share (full or partial) solutions to specific homework problems.

Announcements:

- The first class will meet on September 3 at 2 pm. Note that there is no class on August 29 because the instructor is out-of-town.
- The university deadline for withdrawing from the course is October 31.
- The in-class exams are scheduled for October 8, November 7, and December 5.

Honor Code:

- For the homework assignments you may talk about the problem with fellow students, the TA, and the instructor, but the write-up must be yours.

- For the written assignments and the projects, you are allowed to consult other books, papers, or published material. The Web is also considered a publication media. However, you MUST reference all the sources that helped you in the assignment.
- You should not plagiarize. Therefore, you should write solutions in your own words, even if the solutions exist in a publication that you reference.
- For more information, please refer to the departmental guidelines on academic honesty.

Syllabus:

Date	Lecture topics	Handouts	Reading	Assigned	Due
09/03	Logic 1	Handout 1	Rosen 1.1, 1.2	Problem set 1	
09/05	Logic 2	Handout 2	Rosen 1.3		
09/10	Logic 3	Handout 3	Rosen 1.4, 1.5	Problem set 2	Problem set 1
09/12	Logic 4	Handout 4	Rosen 1.6		
09/17	Proof methods 1	Handout 5	Rosen 1.7, 1.8	Problem set 3	Problem set 2
09/19	No class (career fair)				
09/24	Sets	Handout 7	Rosen 2.1, 2.2		
09/26	Functions	Handout 8	Rosen 2.3	Problem set 4	Problem set 3
10/01	Number theory 1	Handout 9	Rosen 4.1		
10/03	Review				Problem set 4
10/08	**Exam 1**				
10/10	Number theory 2	Handout 10	Rosen 4.3	Problem set 5	
10/15	Combinatorics 1	Handout 11	Rosen 5.1		
10/17	Combinatorics 2	Handout 12	Rosen 5.2		Problem set 5
10/22	Combinatorics 3	Handout 13	Rosen 5.3		
10/24	Induction 1	Handout 14	Rosen 6.1, 6.2		
10/29	Induction 2	Handout 15	Rosen 6.3, 6.4		
10/31	Induction 3	Handout 16	Rosen 6.5		
11/05	Graphs 1	Handout 17	N/A		
11/07	**Exam 2**				
11/12	Graphs 2	Handout 18	N/A		
11/14	Graphs 3	Handout 19	N/A		
11/19	Complexity	Handout 20	Rosen 3.2		
11/21	Recurrences	Handout 21	Rosen 8.3		
11/26	Master theorem	Handout 22			
11/28	No class (Thanksgiving)				

12/03	Review				
12/05	**Exam 3**				