CIT 592 – Mathematical Foundations of Computer Science
University of Pennsylvania
Fall 2011
Instructor: Donna Dietz
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Lecture: TR 1:30-3:00 Towne 313
Recitation: F 1:00-2:30 Towne 313
Office Hours: TR 3:00-4:00, or by appointment

Texts: *Discrete Mathematics for Computer Scientists,* Stein, Drysdale, and Bogart (more than one printing style is available, this will be in the bookstore)
Discrete Mathematics and Its Applications, Kenneth H. Rosen, any edition (buy online cheap)
Elementary Statistics, Allan G. Bluman, 5th edition (or cheapest available, buy online cheap)

Official Course Description: *L/R 592. Mathematical Foundations of Computer Science. (C) Foundations: Sets, Functions, Summations, and Sequences. Introduction to algorithms. Counting techniques: The pigeonhole principle, permutations and combinations. Discrete probability. Selected topics from Number theory and/or Graph theory.*

L/R means Lecture/Recitation, registration in both is required.
(C) indicates the course may be offered either in the Fall or the Spring for one term.

Welcome to the MCIT program at the University of Pennsylvania

This course is part of a two-course sequence in the MCIT program. (CIT596, Theory of Computation, is the other course in this sequence.) This program is intended to prepare students to begin or further their careers in Information Technology. Students were accepted into this program, not for their background (which is typically not computer science or even a closely related field), but because of their solid academic backgrounds which indicate a demonstrated ability to master new skills and accept academic challenges. Students beginning this program are not expected to have any specific background (other than basic algebra), but are expected to have a graduate level academic maturity in terms of study skills, motivation, and the ability to work hard.

Grading: Your final grade for the semester will be weighted as follows: 20% each for Exam I and Exam II, 25% for the Final, and 35% for the projects which will be assigned roughly once per week during the semester. Other announcements will be posted through **Blackboard**. Programming in Python and later Java will be expected. You should already be proficient in these languages or concurrently enrolled in CIT 591.

Recitation: Typically, recitation will be a time for discussions about the projects. Bring your laptop and think of it as a lab session. But, occasionally recitation time may be partially or entirely used to maintian pace with the schedule in the calendar as given.

Calendar:

This course meets 25 times for 90 minutes during the semester, plus once (2 hours) for the final exam.

	date	**agenda**	**chapter titles**
1	Th Sept 8		
2	Tu Sept 13		
3	Th Sept 15		
4	Tu Sept 20		
5	Th Sept 22		CRT
6	Tu Sept 27		
7	Th Sept 29		RSA
8	Tu Oct 4		
9	Th Oct 6	**Exam I**	**(on material from days 1-7)**
10	Th Oct 13		
11	Tu Oct 18		Hanoi
12	Th Oct 20		
13	Tu Oct 25		
14	Th Oct 27		Difference Equations
15	Tu Nov 1		
16	Th Nov 3	**Exam II**	**(on material from days 8 and 10-14)**
17	Tu Nov 8		
18	Th Nov 10		Scheduling
19	Tu Nov 15		
20	Th Nov 17		Statistics
21	Tu Nov 22		
22	Tu Nov 29	Rosen 11.1-11.2	Boolean Functions, Representing Boolean Functions
23	Th Dec 1	R11.3-11.4	Logic Gates, Minimization of Circuits
24	Tu Dec 6	*LAB DAY*	Logic Lab
25	Th Dec 8	Review	
	Mon Dec 19 noon-2	**FINAL EXAM**	**(cumulative, but double weight on material from days 15 forward)**

Project Due Dates:

Project	**Date**
1) Chinese Remainder Theorem (Python)	September 26, Monday 11:59pm
2) RSA (Python)	October 10
3) Hanoi (Python)	October 24
4) Difference Equations (Python)	November 7
5) Scheduling (Java)	November 21
6) Statistics (Java)	December 5

This is a list of problems from Stein/Drysdale for student study:

section		problems	TOPICS
1.1		2-10	Combinatorics
1.2		1-16	
1.3		1-11	
1.5		1,3,5,79,11,13	
2.1		1-14	RSA
2.2		1-22	
2.3		1-14	
2.4		1-16	
3.1		1-15	Logic
4.2		1-19 (homogeneous)	Recurrence Relations
5.1			Probability
5.2		1-10, 14	
5.3		1-13	
5.4		2-12	
5.5		1-10	Hashing
5.6		4,11	
5.7		1-15,19	
6.1		1-19	Graphs
6.2		1-14	

This is a list of problems from the 6th edition of Rosen for student study:

section	page	problems	TOPICS
1.1	16	1-13 odd,23, 27-38 odd, 36, 45, 46	Logic
1.2	28	1, 5, 9	
2.1	119	1,4,5,17	Sets
2.2	130	1,3,4,25-31,35,36, 50, 51, 55	
3.4	208	17, 19	Integers and Division, RSA
3.5	217	4-6, 20	
3.6	229	1-12, 23,24	
3.7	244	3,5,7,11,29,46,47	
3.8	254	1-5,10,11,18-20	Matrices
4.3	308	1,7,9,18	Recursion/Induction
4.4	321	50,51	
5.3	360	1-6,15-17,19-20,25,31,33	Combinatorics
5.4	369	2,6	
5.5	379	1,3,9,11,13,19	
6.1	398	1-15 odd	Discrete Probability
6.2	414	1-5,11-28odd	
7.1	456	1,5,9,25	Recurrence Relations (homogeneous)
7.2	471	1,3,5,13,24,25,28,32	
8.3	542	1-28	Graphs to represent relations
8.6	578	5-11,25-27,32,33,43	POSETS
9.1	595	2-9,21	Graphs
9.2	608	1,3,4,5,7-10,20-25,37	
9.3	618	5,11,25,35,39	
9.4	629	1,5,37	
10.1	693	1-3,17,19,21,22,33	Trees
10.2	708	1-5,9	
10.3	722	1-7,10,13,16-19	
10.4	734	1-10	
10.5	742	5-8	
11.1	756	1-6,25,27,33	Boolean Algebra
11.2	760	1-9 odd, 10, 11	
11.3	765	1-11 odd	
11.4	779	1-7 odd	Circuit minimization