SYLLABUS: CSI 35 DISCRETE MATHEMATICS II   4 credits 4

SYLLABUS: CSI 35 Discrete Mathematics II
PREREQUISITE: CSI 30 and ENG 02 and RDL 02, if required.
TEXT: *Discrete Mathematics and its Applications* Sixth Edition, by
                               Kenneth H. Rosen, McGraw Hill, 2006

Objectives: A successful student in this course will learn to

1. classify basic discrete structures,
2. use graphs and trees as models and tools for studying computational complexity,
3. analyze finite and infinite structures using mathematical reasoning and tools of first order logic,
4. design and analyze algorithms, in particular those based on recursion and iteration,
5. prove formal statements using mathematical induction,
6. use mathematical induction in verification of program correctness.

Suggested Homework

		Suggested in-class examples		**Homework**
Chapter 4: Induction and Recursion (4 weeks)				
4.1	Mathematical Induction	Examples 1-6, 8, 9, 12-14	p. 279	1, 3, 4, 5, 7, 8, 9, 10, 18, 47, 52
4.2	Strong Induction and Well-Ordering	Examples 1-4	p. 291	1, 3, 4, 12,
4.3	Recursive definitions and structural induction	Examples 1-12, 14	p. 308	1-9 odd, 18, 23, 25, 34-36, 44, 47, 48
4.5	Recursive Algorithms	Examples 1, 2, 4, 5-10	p. 321	1, 2, 5, 7, 21, 44, 45
	Computer projects		p. 333	1, 4, 5, 8, 9, 11, 12, 13, 15
	Computations and explorations		p. 334	1, 2, 3, 4, 7

Chapter 8 Relations (3 weeks)

8.1	Relations and their properties	Examples 1-22	p. 527	1, 3, 5, 8, 25, 31, 33, 40, 41, 42
8.2	n-ary relations and their applications	Examples 1-11	p. 536	1-9 odd, 19
8.3	Representing relations	All	p. 542	1, 3, 13, 18, 20, 31, 32
8.5	Equivalence relations	All	p. 562	1, 3, 9, 11-16, 21-24, 43, 46, 47
8.6	Partial orderings	Examples 1-20	p. 578	1, 3, 4, 5, 9, 11, 13, 15, 19-21, 32, 36
	Computer projects		p. 586	1, 2, 3, 4
	Computations and explorations		p. 587	1, 2, 3, 6, 7

Chapter 9 Graphs (3 weeks)

9.1	Introduction to graphs	All	p. 595	1, 3-12 all
9.2	Graph terminology	Examples 1-13	p. 608	1, 2, 3, 5, 7, 8, 9, 18-26 all
9.3	Representing Graphs and Graph Isomorphism	Examples 1-11	p. 618	1-15 odd, 35-43 , odd, 57
9.4	Connectivity	Examples 1-8, 12, 13	p. 629	1-6, 18, 19
9.5	Euler and Hamilton paths	All	p. 643	1-15 odd, 19-23 odd, 31, 33, 35
9.6	Shortest path problems	All	p. 655	1-13 all
9.8	Graph Coloring	Examples 1-4	p. 672	1-11 all, 13, 15
	Computer projects		p. 681	1, 2, 3, 4, 5, 17
	Computations and explorations		p. 682	1, 2, 3, 4, 8, 9, 10, 11

Chapter 10 Trees (4 weeks)

10.1	Introduction to Trees	All	p. 693	1-11 odd, 21, 23
10.2	Applications of Trees	All	p. 708	1, 3, 5, 19, 21, 23, 25, 37, 40, 42
10.3	Tree Traversal	All	p. 722	1-5, 7-15 all
10.4	Spanning Trees	All	p. 734	1-9 all, 13, 15, 23
10.5	Minimum spanning Trees	All	p. 742	1-9 all

Computer projects, computations and explorations for chapter 10: there are many relevant projects listed on p. 747; choose those that correspond to the material covered and emphasized in class.