**BRONX COMMUNITY COLLEGE**

**Of the City University of New York**

**DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

**SYLLABUS: CSI 35 DISCRETE MATHEMATICS II 3 credits 4 hours**

**SYLLABUS:** CSI 35 Discrete Mathematics II

**PREREQUISITE:** CSI 30 & MTH 31 and ENG 02 and RDL 02, if required.

**TEXT:** *Discrete Mathematics and its Applications* Seventh Edition, by

Kenneth H. Rosen, McGraw Hill, 2012

**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 in-class examples**

**Suggested Homework**

**Chapter 5: Induction and Recursion** (4 weeks)

5.1 Mathematical Induction Examples 1-6,

8, 10, 13-15

p. 329 1, 3, 4, 5, 7, 8, 9, 10,

18, 49, 56

5.2 Strong Induction and Well- Ordering

Examples 1-4 p. 341 1, 3, 4, 12,

5.3 Recursive definitions and structural induction

Examples 1-10,

12

p. 308 1-9 odd, 18, 23, 25, 34-

36, 44, 47, 48

5.4 Recursive Algorithms Examples 1, 2,

3, 5-10

|  |  |  |
| --- | --- | --- |
| Computer projects | p. 382 | 1, 4, 5, 8, 9, 11, 12, 13, |
|  |  | 15 |
| Computations and explorations | p. 383 | 1, 2, 3, 4, 7 |

p. 370 1, 2, 3, 7, 21, 44, 45

9.1 Relations and their properties

**Chapter 9 Relations** (3 weeks)

Examples 1-22 p. 581 1, 3, 5, 10, 27, 33, 35,

42, 43, 44

9.2 n-ary relations and their applications

Examples 1-11 p. 589 1-9 odd, 19

9.3 Representing relations All p. 596 1, 3, 13, 18, 20, 31, 32

9.5 Equivalence relations All p. 615 1, 3, 9, 11-16, 21-24,

43, 46, 47

9.6 Partial orderings Examples 1-20 p. 630 1, 3, 4, 5, 9, 11, 13, 15,

19-21, 32, 36

|  |  |  |
| --- | --- | --- |
| Computer projects | p. 638 | 1, 2, 3, 4 |
| Computations and explorations | p. 638 | 1, 2, 3, 6, 7 |

**Chapter 10 Graphs** (3 weeks)

 10.l Graphs and graph models All p. 649 1, 3-12 all

10.2 Graph terminology Examples 1-13 p. 665 1, 2, 3, 5, 7, 8, 9, 18-26 all

10.3 Representing Graphs and

Graph Isomorphism

Examples 1-11 p. 675 1-15 odd, 35-43 , odd,

57

10.4 Connectivity Examples 1, 2,

 3, 5, 6,7, 13,14

p. 689 1-6, 20, 21

10.5 Euler and Hamilton paths All p. 703 1-15 odd, 19-23 odd,

31, 33, 35

10.6 Shortest path problems All p. 707 1-13 all

10.8 Graph Coloring Examples 1-4 p. 732 1-11 all, 13, 15

|  |  |  |
| --- | --- | --- |
| Computer projects | p. 742 | 1, 2, 3, 4, 5, 17 |
| Computations and explorations | p. 743 | 1, 2, 3, 4, 8, 9, 10, 11 |

**Chapter 11 Trees** (4 weeks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11.1 | Introduction to Trees | All | p. 755 | 1-11 odd, 21, 23 |
| 11.2 | Applications of Trees | All | p. 769 | 1, 3, 5, 19, 21, 23, 25, |
|  |  |  |  | 37, 40, 42 |
| 11.3 | Tree Traversal | All | p. 783 | 1-5, 7-15 all |
| 11.4 | Spanning Trees | All | p. 795 | 1-9 all, 13, 15, 23 |
| 11.5 | Minimum spanning Trees | All | p. 802 | 1-9 all |

**Computer projects, computations and explorations for chapter 11:** there are many relevant projects listed on page 808; choose those that correspond to the material covered and emphasized in class.

RK/2003; revised Nov 2003/AW; revised Jan 2007/NEA Updated Jan 2013/AT