Math 112 – Discrete Mathematics
2010 – 2011 Spring Semester

Course Web Page:
  http://www.metu.edu.tr/∼komer/112/

Textbook:
  K.H. Rosen, Discrete Mathematics and its Applications, McGraw-Hill, 6th edition (*available in Reserve*).

Reference books:
  I. Anderson, A First Course in Discrete Mathematics, Springer SUMS, 2001.
  R.P. Grimaldi, Discrete and Combinatorial Mathematics, Addison-Wesley, 4th edition.

Exam Schedule:

- Midterm 1 : **March 31** (30%)

- Midterm 2 : **May 5** (30%)

- Final : **To be announced** (40%)

Tentative Course Outline:

1. **Counting** (3 weeks)

    (a) The Basics of Counting
    (b) The Pigeonhole Principle
    (c) Permutations and Combinations
    (d) Binomial Coefficients
    (e) Generalized Permutations and Combinations

2. **Discrete Probability** (2 weeks)

    (a) An Introduction to Discrete Probability
    (b) Probability Theory
    (c) Bayes' Theorem

3. **Advanced Counting Techniques** (4 weeks)

    (a) Recurrence Relations
    (b) Solving Recurrence Relations
    (c) Divide-and-Conquer Relations
    (d) Inclusion-Exclusion
    (e) Applications of Inclusion-Exclusion

4. **Graphs** (4 weeks)

    (a) Graphs and Graph Models
    (b) Graph Terminology and Special Types of Graphs
    (c) Representing Graphs and Graph Isomorphisms
    (d) Connectivity
    (e) Euler and Hamilton Paths
    (f) Shortest Path Problems
    (g) Planar Graphs
    (h) Graph Coloring

5. **Trees** (If time permits)