Course Information Sheet

Course Title: Graph Theory, Math452, Call No 7741, Spring 2004
9:30 a.m.–10:20 p.m., M-W-F, at M&N 206
University of Nebraska – Lincoln

Instructor: Dr. Jon-Lark Kim.
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Text: *Introduction to Graph Theory*, Douglas B. West, *Second Ed.*, Prentice Hall, 2000. (Same book as Math852)

References:

1. Introductory Combinatorics by R. Brualdi (well known book)
2. A Course in Combinatorics (advanced graduate level)

Office Hours: M-W-F 10:30 a.m.–11:20 a.m.or email me to arrange an appointment.

Grading Policy: Homework (30%) [Or Homework (20%) + Project (10%)] (this will be decided after the first midterm), Two one-hour midterms (20%), One two-hour Final (30%). Your final grade will be based on the number of points you receive. While I may choose to adjust the course grading scale, the following gives a possible boundary grade. A: 90%, B: 80%, C: 70%, D: 60%, F: below 50%.

Topics:

- Ch. 1. Fundamental Concepts on Graph Theory
  - 1.1. What's a graph?
  - 1.2. Paths, cycles, and trails
  - 1.3. Vertex degrees and counting
  - 1.4. Directed graphs (a little)
- Ch. 2. Trees and Distances
  - 2.1. Basic properties
  - 2.2. Spanning trees and enumeration
  - 2.3. Minimum spanning tree
- Ch. 3. Matchings and Factors
  - 3.1 Matchings ad covers (Hall's matching condition)
  - 3.2 Maximum bipartite matching
- Ch. 4. Connectivity and Paths
  - 4.1 Cuts and connectivity
- Ch. 5. Coloring of Graphs
  - 5.1 Vertex colorings and upper bounds
  - 5.2 Graphs with large chromatic number
- Ch. 6. Planar Graphs
  - 6.1. Euler's formula
  - 6.2. Kuratowski's theorem on planar graphs
- Ch. 7. Edges and Cycles
  - 7.1. Line graphs and edge-coloring
  - 7.2. Hamiltonian cycles
- Chapter 8 contains advanced topics, such as perfect graphs, matroids, Ramsey theory, extremal problems, random graphs, eigenvalues of graphs. These can be project topics.

Other related topics:

1. Combinatorics
2. Coding theory