

Math 612 - Spring 2002

# DISCRETE MATHEMATICS

**Instructor:** Joachim Rosenthal

**Time:** MWF 8:30-09:20

**Location:** Hurley 171

## Course Description:

Math 612 is part of a new sequence of basic graduate courses in applied mathematics.

The course will provide an introduction into different subjects of discrete mathematics. Topics to be covered are:

- (1) Graph Theory: Trees and graphs, Eulerian and Hamiltonian graphs; tournaments; graph coloring and Ramsey's theorem. Applications to electrical networks.
- (2) Enumerative Combinatorics: Inclusion-exclusion principle, Generating functions, Catalan numbers, tableaux, linear recurrences and rational generating functions, and Polya theory.
- (3) Partially Ordered Sets: Distributive lattices, Dilworth's theorem, Zeta polynomials, Eulerian posets.
- (4) Projective and combinatorial geometries, designs and matroids.

## Course Book:

J. H. van Lint and R. M. Wilson. *A Course in Combinatorics*, second edition. Cambridge University Press, Cambridge, 2001.