Discrete Math (21701), Fall 2004
Cliff Smyth (csmyth@andrew), office WEH 6218 MF 11:30-12:30 (or by appt)
This course is an introduction to graduate study in discrete mathematics.
Your grade will be determined by HW. A new assignment will be given out
roughly every two weeks.
Some topics we will cover:

1. Ramsey Theory (Ramsey’s Theorem, Van der Waerden’s Theorem, Hales Jewett Theorem)
2. Generating Functions (formal power series, exponential formula, Cayley’s Formula)
3. Inclusion-Exclusion
4. Matchings (Hall’s Theorem)
5. Extremal Combinatorics (Sperner’s Theorem, Erdős Ko Rado Theorem, Kruskal Katona Theorem, Fischer’s Inequality, Ray-Chaudhuri Wilson Theorem (and the linear algebraic method), Turan’s Theorem)
6. The Probabilistic Method (the basic method, first moment/alterations, Markov’s inequality, Lóvasz Local Lemma, Second Moment Method, Chernoff Bounds, correlation inequalities (Kleitman’s Lemma, FKG Inequality, 4-Functions Theorem))

No one book covers all of the above so the following will be on reserve in the E & S library: Ramsey Theory by Graham, Rothschild, and Spencer (topic 1), Generatingfunctionology by Wilf and Zeilberger (topic 2), Combinatorics by Bollobás (topic 3 and correlation inequalities), and The Probabilistic Method by Alon and Spencer (topic 6).