



**Catalog Description:**

Enumerative techniques, combinatorial identities, graph theory, algorithms, error correcting codes

**Purpose for the Course:**

Combinatorics and discrete mathematics are increasingly important, particularly for their applications in computer science. This course will give a brief overview of this subject.

**Prerequisite:**

C- or better in 2568 or 5520H; credit for 568, 571, or 520H.

**Exclusions:**

Not open to students with credit for Math 5529H.

**Topics List:**

1. Counting principles: factorials, permutations and combinations, binomial coefficients, Stirling numbers, double counting.
2. Combinatorial identities: bijections, binomial theorem, generating functions.
3. Graph theory: bridges of Konigsberg, Eulerian circuits, trees, edge coloring, vertex coloring, planar graphs, Kempe's proof of the 5-color theorem
4. Error correcting codes: sphere packing bound, Hamming codes
5. (Optional.) Algorithms: Dijkstra's algorithm for minimum spanning tree, depth first and breadth first algorithms for trees, greedy algorithm for graph coloring.