MACM 201 Syllabus

• Topic #1 – Advanced Probability
  • Review of Finite Probability
  • Conditional Probability
• Topic #2 - Inclusion-Exclusion
  • The Principle of Inclusion-Exclusion (review)
  • Generalized Inclusion-Exclusion
  • Derangements
• Topic #3 – Advanced Enumeration
  • Introduction to Generating Functions
  • Calculational Techniques
  • Partitions of Integers
• Topic #4 - Recurrence Relations
  • First-Order Linear Recurrence Relations
  • Second-Order Linear Homogeneous Recurrence Relations with Constant Coefficients
  • Nonhomogeneous Recurrence Relations
  • The Method of Generating Functions
  • Divide-and-Conquer Algorithms (optional)
• Topic #5 - Graph Theory
  • Definitions
  • Subgraphs, Complements, and Graph Isomorphism
  • Vertex Degree: Euler Trails and Circuits
  • Planar Graphs
  • Hamilton Paths and Cycles
  • Graph Coloring and Chromatic Number (optional)
• Topic #6 - Optimization and Matching
  • Review of Trees
  • Dijkstra's Shortest-Path Algorithm
  • Minimum Spanning Trees: Kruskal's and Prim's Algorithms
  • Matching Theory (optional)