

Marshall University

College of Science

MTH 440: Graph Theory and Combinatorics

Course catalog description

The course is designed to introduce students in mathematical sciences to the theorems, techniques and applications of graph theory and combinatorics.

Credit hours

3 hours

Prerequisites

A grade of C or higher in MTH 300

List of topics

- Enumerative combinatorics
 - Permutations and combinations. Binomial coefficients. Stirling numbers of the second kind.
 - The Inclusion-exclusion principle
 - Probabilities
 - Generating functions
 - Recurrence relations, solving linear homogeneous recurrences
- Graph theory
 - Common families of graphs
 - Connectedness and paths
 - Planar graphs
 - Eulerian and Hamiltonian graphs
 - Graph colorings and the Four Color Theorem
 - Trees, labeled trees, and spanning trees
 - Tree traversal algorithms
 - Flows, the maximum flow / minimum cut theorem

Suggested textbooks

- *How to Count*, second edition, Allenby and Slomson, CRC Press, ISBN 978-1-420-008260-9

- *Introduction to Enumerative Combinatorics*, Bona, McGraw-Hill, ISBN 978-0-073-12561-9

Last updated

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