

MAU34107 Combinatorics

Credit weighting

5 ECTS credits

Semester taught

Semester 1

Module Coordinator

Ruth Britto (brittor@tcd.ie)

Learning Outcomes

On successful completion of this module, students will be able to:

- Describe and employ several techniques of combinatorial proofs and calculations
- Demonstrate the existence or non-existence of combinatorial objects
- Count permutations, combinations, multisets, and partitions of finite sets
- Use ordinary and exponential generating functions, and their products and compositions
- Define and analyze basic concepts of graphs, directed graphs, and weighted graphs
- Define posets and their algebraic properties, and give examples

Module Content

- Principles of enumeration: permutations, partitions, sieve methods, generating functions
- Graph theory: paths, cycles, spanning trees, coloring, matching
- Partially ordered sets, lattices, hyperplane arrangements

Textbook

A Walk Through Combinatorics, 4th ed., M. Bóna

Supplementary Reading

Enumerative Combinatorics, vol. 1, 2nd ed., R. Stanley

Combinatorics, 2nd ed., N. Loehr

Module Prerequisite

MAU11101 (Linear Algebra I)

Assessment Detail

The final mark is 75% of the exam mark plus 25% from continuous assessment.