MAU34107 Combinatorics

Credit weighting
>   5 ECTS credits

Semester taught
>   Semester 1

Module Coordinator
>   Ruth Britto (britto@maths.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 Details
>   The final mark is 70% of the exam mark plus 30% continuous assessment consisting of homework assignments given throughout the term.