

Course Code
COMP 2711

Course Title
Discrete Mathematical Tools for Computer Science

Course Description

Basic concepts in discrete mathematics needed for the study of computer science: enumeration techniques, basic number theory, logic and proofs, recursion and recurrences, probability theory and graph theory. The approach of this course is specifically computer science application oriented. Prerequisite(s): A passing grade in AL Pure Mathematics/AL Applied Mathematics; OR level 3 or above in HKDSE Mathematics Extended Module M1/M2. Corequisite(s): (For students without prerequisites) MATH 1012 OR MATH 1013 OR MATH 1014 OR MATH 1020 OR MATH 1023 OR MATH 1024.

Exclusion(s): COMP 2711H, MATH 2343

List of Topics

- Propositional Logic, Quantifiers, Predicate Logic, Inference, Proofs
- Sets and Functions
- Basic Counting, Binomial Coefficients
- Probability, Inclusion and Exclusion, Independence
- Random Variables, Expectation, Variance
- Number Theory, Modular Arithmetic, Inverses and GCDs, RSA Algorithm
- Induction and Recurrence
- Complexity, Algorithms
- Graph Theory

Textbooks

Discrete Mathematics and its Applications. Kenneth H. Rosen, 8th Edition, McGraw-Hill

Reference books

N/A

Grading Scheme

Homework	25%
In-Class Exercises	10%
Midterm	25%
Final Exam	40%
Total	100%

Course Intended Learning Outcomes

1. Understand the formulation of common problems in several areas of discrete mathematics, including combinatorics, number theory and cryptography, logic and proof, recursion and recurrences, probability theory and graph theory.
2. Understand the connection between the discrete mathematical tools learned and some core computer science topics covered later in the curriculum, including computational complexity, information security, recursive functions and data structures.
3. Apply the mathematical techniques learned to solve problems in a range of topics.
4. Demonstrate a level of mathematical maturity by solving problems using an array of different proof techniques.

Assessment Rubrics

N/A