

# The Hong Kong University of Science and Technology

## UG Course Syllabus

[Course Title]

Honors Discrete Mathematical Tools for Computer Science

[Course Code]

COMP 2711H

[No. of Credits]

4

[Any pre-/co-requisites]

Level 5\* or above in HKDSE Mathematics Extended Module M1/M2; OR grade A- or above in MATH 1014; OR grade B+ or above in MATH 1020 / MATH 1024

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### Course Description

Discrete mathematics needed for the study of computer science: sets, functions, propositional logic, predicate logic, rules of inference, proof techniques, pigeonhole principle, basic and generalized permutations and combinations, binomial coefficients, inclusion-exclusion principle, probability theory, Bayes theorem, expectation, variance, random variables, hashing, cryptography and modular arithmetic, Euclid's division theorem, multiplicative inverse, divisibility, RSA cryptosystem, Chinese remainder theorem, mathematical induction, strong induction and well-ordering property, recursion, recurrence relations, graph representation, isomorphism, connectivity, Eulerian paths, Hamiltonian paths, planarity, graph coloring. Gentle introduction to many discrete mathematical concepts that will appear later in more advanced computer science courses.

### Assessments:

[List specific assessed tasks, exams, quizzes, their weightage]

Assessment Task	Contribution to Overall Course grade (%)
Mid-Term Examination	30%
4 x Homework	40%
Final examination	30%

### Required Texts and Materials

[List required textbooks, readings, and any other materials]

Concrete Mathematics: A Foundation for Computer Science, by Ronald Graham, Donald Knuth, and Oren Patashnik

**[Optional] Additional Resources**

[List any additional resources, such as online platforms, library resources, etc.]

Introduction to Graph Theory by West