

### Course Outline

Topics will generally be selected from the following, and many counting problems in daily life settings will be studied.

1. Various forms of combinations and permutations (e.g. with/without repetition, circular, different restrictions)
2. Various formulas and techniques of counting (e.g. binomial theorem and its generalisations, inclusion-exclusion principle, generating functions, recurrence relations)
3. Famous numbers arising from counting problems (e.g. derangement numbers, Fibonacci numbers, Catalan numbers, Stirling numbers, Bell numbers, Schröder numbers)

### Learning Outcomes

On successful completion of this course, students should be able to:

Course Learning Outcomes (CLO)	
CLO 1	solve various combination and permutation problems using various formulas in combinatorics;
CLO 2	apply the techniques of recurrence relations and generating functions to counting problems;
CLO 3	describe the meanings and properties of some famous numbers arising from counting problems.

### Study Load

-- 15-20 hours: study-at-own-pace (prerecorded video lectures, additional reading materials)  
 -- 15-20 hours: face-to-face classes (discussions, tutorials, assessments) - optional  
 (In addition to the above, students are expected to devote time to work on problems, do revisions and carry out further explorations. An additional 50 hours is expected.)

### Assessments

-- 50% Final Examination  
 -- 50% Coursework (including participation, assignments, tutorials, quizzes/tests)

No supplementary examination will be offered.