

COMP 2130 - Discrete Mathematics for Computer Science

Calendar Description: An introduction to the set theory, logic, integers, combinatorics and functions for today's computer scientists

Prerequisites: COMP 1020 or COMP 1021 (C), and a "C" in one of MATH 1210, MATH 1211, MATH 1300, MATH 1301 (136.130), MATH 1310 (136.131); and one of: MATH 1500, MATH 1501(136.150), MATH 1510 (136.151), MATH 1520 (136.152), the former 136.153, or MATH 1690 (136.169).

This course is a prerequisite for: COMP 2080, COMP 3120, COMP 3130 and COMP 4140.

Outline

- 1) Introduction (1 week)
Introduction to course, propositions, logical operators, truth tables, logical equivalences, implications, laws of equivalences.
- 2) Proof Methods (1 ½ weeks)
Implications, proof techniques (direct, contrapositive, and contradiction), introduction to elementary set theory.
- 3) Elementary Number Theory (3 ½ weeks)
Number systems, primes, divisibility, congruences, factorization, modular arithmetic, linear Diophantine equations, \mathbb{Z}_p , Fermat's Little theorem.
- 4) Induction (1 ½ weeks)
Weak and strong induction.
- 5) Predicate Calculus (1/2 week)
- 6) Counting and Probability (3 weeks)
Cardinality, ultimate sets, positive sets, probability and counting, addition and multiplication rules, permutations and combinations, combinations with repetition, Pascal's triangle, binomial theorem
- 7) Misc. topics and Review (1 week)

Text: S.S. Epp, *Discrete Mathematics with Applications (third edition)*, Brooks/Cole, 2004.