Montclair State University
Computer Science Department

Course	CMPT 285-01 (3 Semester Hours), Spring 2014 Discrete Math Structures
Class Schedule	TR 11:30am - 12:45pm RI 376
Professor	Jing Peng
Email	jing.peng@montclair.edu
Office Hours	2:30pm - 5:30pm R or by appointment (RI 316)

Prerequisites: CMPT 183-Foundations of Computer Science I.

Required Text: Discrete Mathematics and Its Applications (7th Edition), Kenneth H. Rosen

Overview: This course provides an introduction to the area of mathematics called *discrete mathematics*. It is a branch of mathematics that deals with finite sets of objects. Discrete mathematics is different from "continuous" mathematics-classical theory of calculus. Discrete mathematics provides the mathematical foundations for many computer science courses such as data structures, algorithms, databases, computer security and operating systems. Also, many real-world problems are discrete by nature. For example, suppose you want to know how many bytes are needed to encode a music file. You will not be happy with an answer of 1000.3 bytes that you will obtain from calculus. The answer actually suggests two options: 1000 or 1001 bytes. However, a simple extraction will no longer be possible for complex optimization problems. To solve these discrete problems, we have to rely on tools provided by discrete math.

Goals: This course is to

- enable students to learn general knowledge about discrete mathematics, and more in-depth knowledge of selected topics;
- enable students to understand and appreciate the methods used to construct mathematical proofs.

Course Outcomes: At the end of the course, students should

- know the basic definitions and concepts of discrete math, and how to apply them;
- know more complex definitions and concepts, and how to apply them in similar situations;
- know the basic techniques and methodologies in the topics covered;

- understand new situations and definitions, derive their formal meaning, and connect them to existing knowledge;
- be able to model real-world problems mathematically and derive useful results.

Grading Policy Class participation, Homework (10%), Midterm1 (25%), Midterm2 (30%), Final (35%).
Students are expected to read the assigned text material and attempt to work the exercises before each class

Late Assignments: Assignments are due at class time on the date they are due. No late assignments will be accepted. No make-up tests will be given unless there is an extraordinary situation.

Schedule:

- Week 1: Propositions, logical connectives, and logical equivalences (1.1–1.3)
- Week 2: Predicates and quantifiers (1.4–1.5)
- Week 3: Sets, set operations, cardinality, and power sets (2.1–2.2,2.5)
- Week 4: Functions, properties, sequences, summations, and countable sets (2.3–2.4)
- Week 5: Basic number theory, greatest common divisors, and congruence (4.1, 4.3, 4.6)
- Week 6: Basic proof techniques (1.6–1.8) and mathematical induction (5.1–5.3)
- Week 7: Counting techniques, permutations and combinations (6.1–6.3)
- Week 8: Relations, their properties, and representation of relations (9.1–9.3)
- Week 9: Closures of relations (9.4)
- Week 10: Equivalence relations, and partial orderings (9.5–9.6)
- Week 11: Discrete probability, probability of events, complements and union of events; Uniform distribution, conditional probability, and independence (7.1–7.2)
- Week 12: Bayes' theorem, expectation and variance (7.3–7.4)