Carleton University
School of Mathematics and Statistics
Discrete Structures and Applications
Math3855A/3825A, Winter 2013

Instructor: Dr. Steven Wang
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Office hours: 1:30pm -2:30pm on Monday and Wednesday;

Office Location: 4368HP

Day and time of course: Tuesday, Thursday : 2:35 pm - 3:55 pm, Tory Building 234

Textbook: "*Discrete Mathematics*" by Norman L. Biggs (Oxford Science Publications, 2nd edition).

Prerequisites: One of MATH2108 or MATH3101.

Course Objective: The purpose of this course is to introduce students to the methods and techniques of discrete mathematics and applications. We will study 4 major topics: Enumeration (elementary methods, inclusion and exclusion, and etc); Generating functions and applications (recurrence relations, partitions of positive integers, etc); Graph theory and algorithms (connectivity, planarity, Hamiltonian cycle and Eulerian walk, etc); Error-correcting codes.

Evaluation: Midterm (15%), Tutorials (5%), Assignments (20%), and Final Examination (60%).

Tutorials: Thursday 11:35 am -12:25 pm, Tory Building 234. TA's name and office hour will be announced later.

Midterm Exam: The midterm exam (Feb. 28) worth 15 marks.

Assignments: Two assignments (10 marks each). Due dates: Feb. 14 and Mar. 13.

Final Examination: This is a three hour closed-book exam scheduled by the University and will take place sometime during the examination period.

Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://carleton.ca/equity/accommodation/student_guide.htm

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Students with disabilities requiring academic accommodations: in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by the last official day to withdraw from classes in each term. For more details visit the PMC website: http://www.carleton.ca/pmc/students/acad_accom.html

Tentative lecture schedule

Week	Dates	Sections	Topics
1	Jan 7-11	6.2; 6.4; 10.1-10.2	Introduction, Pigeonhole and addition principle. Counting sets of pairs;
2	Jan 14-18	10.3 -10.6	Euler's function; Functions, words and selections; ordered selections without repetitions; permutations
3	Jan 21-25	11.1 - 11.4	binomial numbers; unordered selections with repetitions; binomial theorem;
4	Jan 28 - Feb 1	11.5-11.7; 12.1 - 12.2	sieve principal; designs and t-designs; partitions of sets;
5	Feb 4-8	12.3- 12. 4; 25.1	Multinomial numbers; partitions of a positive integer;
6	Feb 11-15	25.1 - 25.3	power series and properties; Partial fractions; binomial theorem for negative exponents **Assign # 1 due on Feb. 14**
7	Feb. 18-22		reading week, no class
8	Feb. 25-Mar. 1	25.4 - 25.6	Generating functions; homogenous and non-homogenous linear recurrences; **Midterm (Feb. 28)**
9	Mar. 4 -8	26.1-26.2 26.3-26.4;	partitions and diagrams; conjugate partitions; Partitions and generating functions; restricted partitions
10	Mar. 11-15	15.1-15.6	Graphs; isomorphism; valency; paths and cycles; trees; vertex colouring; **Assign # 2 due on Mar. 14**
11	Mar. 18-22	Course notes;	Planar graphs; Euler's theorem;
12	Mar. 25-29	24.1 -24.2	words, codes and errors; Linear codes
13	Apr. 1-5	24.3 - 24.4	construction and error correction;
14	Apr. 8-10		Course review