# MATH 222

**Term:** Winter 2013

**Title:** Introduction to Discrete Mathematics

**Section:** Q2

**Instructor**: I. E. Leonard
Office: CAB 679
Telephone: 780-492-2388
Office hours: T & R 11:00 am - 1:00 pm
Email: ileonard@ualberta.ca/
Course webpage: http://www.math.ualberta.ca/~isaac/

**Lecture Room & Time:** TEL 150 10:00 am – 10:50 am

**Other Instructor**: Trevor Pasanen
Office: CAB 509
Telephone: 780-492-8752
Office hours: MWF 11:00 am – 12:00 pm, TH: 12:30 pm – 1:00 pm, or by appointment
Email: tpasanen@ualberta.ca
Course webpage: eClass (Moodle) https://eclass.srv.ualberta.ca

**Math Party:** Wednesdays, SAB 325, 1:00 pm – 3:00 pm

**Required Textbook:**
Professor Scarlet's Notebook, by Ed Leonard, Ted Lewis, Andy Liu
($18, Cash Only: Weekdays, January 7 - 11, CAB 680, 8:30 am - 4:30 pm)

**Recommended Textbook:**
The Puzzling Adventures of Dr. Ecco, by Dennis Shasha (Bookstore)

**Course Description:** A problem-solving approach to discrete mathematics, covering secret codes, public-key codes, error-correcting codes, enumeration, recurrence relations, induction, graph theory, graph algorithms and parallel algorithms. Prerequisite: Any 100-level mathematics course or SCI 100, MATH 120, 125 or 127 recommended.

**Course Evaluation:**

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|---|---|---|
| Assignment 1 | 5% | Due: 5pm, Thursday, January 24th |
| Assignment 2 | 5% | Due: 5pm, Thursday, February 14th |
| Assignment 3 | 5% | Due: 5pm, Thursday, March 21st |
| Assignment 4 | 5% | Due: 5pm, Thursday, April 4th |
| Group Project | 5% | Due: 5pm, Thursday, March 28th |
| Midterm | 25% | Friday, March 8th, In class |
| Final Exam | 50% | 9am, Tuesday, April 23, Location: TBA |

**Grading:** Percentage scores will be converted to the University grading system according to the chart below. Grades may be adjusted, by no more than one step in either direction, to account for exceptional grade distributions.

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|---|---|
| A+ = 95 -100 | C+ = 65 - 69 |
| A = 90 - 94 | C = 60 - 64 |
| A- = 85 - 89 | C- = 57 - 59 |
| B+ = 80 - 84 | D+ = 53 - 56 |
| B = 75 - 79 | D = 50 - 52 |
| B- = 70 - 74 | F = 0 - 49 |

**Homework Assignments:** Approximately every 2-4 weeks there will be a written homework assignment due. Students may work in groups of up to 3 members and hand in one assignment containing the collective work of the group. The homework assignments are to be handed in to the assignment drop box on the 3rd floor of CAB labeled: Math 222.

**Feedback Questions:** There will be feedback questions posted on the course web page. Throughout the semester, students have the option of handing in written solutions to the posted feedback questions for an added bonus to assignment grades. Students cannot receive a bonus exceeding the worth of the assignment grades. The feedback questions will provide the instructor and the student with feedback on the student's understanding of the material.

**Group Project:** A description of the project will be given on the course webpage. Students may work in groups of up to 3 members and hand in one project containing the collective work of the group. The project is to be handed in to the assignment drop box on the 3rd floor of CAB labeled: Math 222.

**Exams:** Your student photo I.D. is required at exams to verify your identity. Students will not be allowed to begin an examination after it has been in progress for 30 minutes. Students must remain in the exam room until at least 30 minutes has elapsed. The midterm will cover all the material up to and including the topic "Coding Theory and Cryptography"; the final exam will cover the whole course (cumulative).

**Important Dates:**

- January 18th , 2013 — Last day to add/drop courses
- February18th-22nd, 2013 — Statutory Provincial Holiday and Reading Week; no classes
- March 15th, 2013 — Last day to withdraw from classes
- March 29th, 2013 — Good Friday; no classes
- April 1st , 2013 — Easter Monday
- April 12th, 2013 — Last day of classes.

**Learning Outcomes:** At the end of the course, students are expected to have gained problem solving skills in the area of discrete mathematics. Specific competencies involve:

- Using modular arithmetic as a problem solving tool
- Drawing state diagrams to determine winning strategies in two player games
- Solving existence problems with the pigeon hole principle
- Creating error correcting and detecting codes
- Playing the role of the sender, receiver, or kibitzer with mono alphabetic codes and ploy alphabetic codes
- Solving recurrence relations
- Using mathematical induction to prove statements about the integers
- Using the handshaking lemma to prove graph theory results

**Missed Midterm:** A student who cannot write a midterm due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for an excused absence. To apply for an excused absence, the student must present supporting documentation pertaining to the absence to the instructor within two working days following the scheduled date of the missed term work, or as soon as the student is able. In the case of an incapacitating illness, either a medical note or a statutory declaration (which can be obtained at the student's Faculty Office) will be accepted. The weight of the missed exam will be transferred to the final exam. An excused absence is a privilege and not a right; there is no guarantee that an absence will be excused. Misrepresentation of Facts to gain an excused absence is a serious breach of the *Code of Student Behaviour*.

**Missed Final Examination:** A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Such an application must be made to the student's Faculty office within 48 hours of the missed examination and must be supported by a Statutory Declaration (*in lieu* of a medical statement form) or other appropriate documentation (Calendar section 23.5.6). Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of Facts to gain a deferred examination is a serious breach of the *Code of Student Behaviour*. Any deferred final examinations are scheduled as follows:

Date: Saturday, May 4th
Time: 9:00 AM (students must arrive by 8:30 AM to register)
Location: CAB 357

**Re-examination:** A student who writes the final examination and fails the course may apply for a re-examination. Re-examinations are rarely granted in the Faculty of Science. These exams are governed by University (Calendar section 23.5.5) and Faculty of Science Regulations

(Calendar section 192.5.9). Misrepresentation of Facts to gain a re-examination is a serious breach of the *Code of Student Behaviour*.

## STUDENT RESPONSIBILITIES

**Academic Integrity:** The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the *Code of Student Behaviour* (online at www.governance.ualberta.ca) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University. All forms of dishonesty are unacceptable at the University. Any offense will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offenses. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for **cheating** on any examination will include **a disciplinary failing grade** (no exceptions) and senior students should expect a period of suspension or expulsion from the University of Alberta.

**Cell Phones:** Cell phones are to be turned off during lectures, labs and seminars. Cell phones are not to be brought to exams.

**Audio or Video Recording:** Audio or video recording of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Recorded material is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the instructor.

**Students with Disabilities:** Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support & Disability Services (2-800 Students' Union Building).

**Academic Support Centre**: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Academic Support Centre (2-300 Students' Union Building).

**Decima Robinson Support Centre for Mathematical & Statistical Sciences:** Students who require additional help with assignments or have questions about the course material in general are encouraged to visit the Decima Robinson Support Centre (528 Central Academic Building). Graduate students will be available to provide one-on-one help. In order to get maximum help during each visit, students are asked to be specific about the problem with which they are seeking help. The Centre is open Monday to Friday, 9:00 – 15:00.

**Disclaimer:** Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this document. Students must verify this date on BearTracks when the Final Exam Schedule is posted.