Discrete Mathematics for Engineers (ELEE 2110U)

Fall 2023
Course Outline

Instructor

Dr. Mennatullah Siam
Home page: https://engineering.ontariotechu.ca/people/ecse/mennatullah.siam.php
Office: SIRC-3388
Office Hours: Tuesdays: 11 am – 12:30 pm
Email: Only through Canvas (Don't be so quick to send an email, only when it is very important & urgent)

Course Description

This course covers the basic topics in discrete mathematics including: sets and set operations, propositional logic, predicate logic, rules of inference; methods of proof and reasoning, modular arithmetic, counting, pigeon-hole principle, induction, deduction, relations, functions, graphs, graph algorithms, shortest path, trees, and combinatorics.

Course Objective

This course introduces the fundamentals of discrete math with an emphasis on applications in engineering.

Learning Outcomes

Students will be familiar with and develop an understanding of these three themes:

1) Mathematical reasoning
2) Combinatorial analysis
3) Discrete structures and algorithmic thinking

Prerequisite

Prerequisites: MATH 1850U (Linear Algebra) and MATH 1020U (Calculus-II)

Computer Experience

No software packages and computer programming skills are required. Canvas is widely used, and students are expected to inform themselves regularly about the course details through it.

Textbook

- A. Grami, *Discrete Mathematics: Essentials and Applications*, Elsevier (Academic Press), 2022; ISBN: 978-0-12-820656-0.
- The textbook is closely followed. It is totally up to the students if they want to buy it.
- Any book and reputable/respected university/college website on discrete math can prove to be useful.

Course Contents (from the textbook):

Chapter 1:	Propositional Logic:	Sections: 1.1 – 1.4
Chapter 2:	Predicate Logic:	Sections: 2.1 – 2.4
Chapter 3:	Rules of Inference:	Sections: 3.1 – 3.4
Chapter 4:	Proof Methods:	Sections: 4.1 – 4.8
Chapter 5:	Sets:	Sections: 5.1 – 5.5
Chapter 7:	Functions:	Sections: 7.1 – 7.4
Chapter 8:	Boolean Algebra	Sections: 8.1 – 8.4
Chapter 9:	Relations:	Sections: 9.1 – 9.5

Chapter 10:	Number Theory:	Sections: 10.1 – 10.8
Chapter 13:	Induction:	Sections: 13.1 – 13.4
Chapter 14:	Recursion:	Sections: 14.1 – 14.4
Chapter 15:	Counting Methods:	Sections: 15.1 – 15.5
Chapter 18:	Graphs:	Sections: 18.1 – 18.4 & 18.6
Chapter 19:	Trees:	Sections: 19.1 – 19.5

Mark Distribution

In-class Quizzes:	14% (= 3 quizzes as 5%, 5%, 4%, resp.)
Tests:	36% $(= 3 \times 12\%)$ → The best 3 out of 4 tests will be considered.
Final Exam:	50%

Course Organization

Two 80-minute lectures and one 80-minute tutorial per week for one semester

Lectures

- It is strongly recommended that all students attend all lectures and pay full attention at all times.
- Lectures will start on Tuesday 5th September, 2023.

Tutorials

- It is highly recommended to attend tutorials and attend the tutorial slot you have been assigned to.
- TA will solve problems, explain solutions, and answer questions.
- Tutorials start on Monday September 11th.

Office Hours

- Office hours start on Monday September 11th.
- Run by the instructors:
    - Dr. Mennatullah Siam: Tuesdays: 11:00 am – 12:30 pm in his office (SIRC-3388)
- Run by TAs: **TBD**

Tests

- There are four one-hour equally-valued, closed-book tests.
- A test consists of 6 equally-valued questions, a question may have more than one part.
- You can bring only a summary sheet according to the specifications mentioned in this course outline.
- Questions and concerns about marking a test is addressed by the TA who marked it.
- Write the test in the slot and the classroom you have been assigned to.

In-class Quizzes:

- There will be three in-class pop quizzes, of 20 minute duration, open-book.
- Each quiz will include two questions only.
- The quizzes will be given 5%, 5%, and 4% resp. of the final grade, and will include study material covered in the **last two weeks** from the date of the quiz.
- There are **no make-up quizzes**.

Final Exam

- There is a two-and-a-half hour, closed-book final exam.

- The exam consists of twenty (25) equally-valued questions, a question may have more than one part.
- You can bring only a summary sheet according to the specifications mentioned in this course outline.
- Students are responsible to know the entire material taught in the course for the final examination.
- Final exam will be scheduled during the exam period **TBD**.
- Final exam will be marked by the instructor.
- Final exam is for the evaluation purposes only and will not be returned to students.

Students with Disabilities

- Accommodating students with disabilities at Ontario Tech is a responsibility shared among various partners: the students themselves, SAS staff and faculty members. To ensure that disability-related concerns are properly addressed during this course, students with documented disabilities and who may require assistance to participate in this class are encouraged to speak with me as soon as possible. Students who suspect they have a disability that may affect their participation in this course are advised to go to Student Accessibility Services (SAS) as soon as possible. Maintaining communication and working collaboratively with SAS and faculty members will ensure you have the greatest chance of academic success.
- When on campus access is allowed, students taking courses on north Oshawa campus can visit Student Accessibility Services in the Student Life Building, U5, East HUB (located in the Founders North parking lot). Students taking courses on the downtown Oshawa campus can visit Student Accessibility Services in the 61 Charles St. Building, 2nd Floor, Room DTA 225 in the Student Life Suite.
- Disability-related and accommodation support is available for students with mental health, physical, mobility, sensory, medical, cognitive, or learning challenges. Office hours are 8:30am-4:30pm, Monday to Friday, closed Wednesday's 8:30am – 10:00am. For more info on services provided, you can visit the SAS website at https://studentlife.ontariotechu.ca/services/accessibility/index.php. Students may contact Student Accessibility Services by 905-721-3266, or email studentaccessibility@ontariotechu.ca.
- When on campus access is allowed, students who require the use of the Test Centre to write tests, midterms, or quizzes must register online using the SAS test/exam sign-up module, found here https://disabilityservices.ontariotechu.ca/uoitclockwork/custom/misc/home.aspx. Students must sign up for tests, midterms, or quizzes at least seven (7) days before the date of the test.
- Students must register for final exams by the registration deadline, which is typically two (2) weeks prior to the start of the final examination period. SAS will notify students of the registration deadline date.