

# ECE 108: Discrete Math & Logic

## Spring 2020

University of Waterloo, Faculty of Engineering  
Department of Electrical and Computer Engineering

**Start – End Dates:** May 11 – Aug 5, 2020

Instructors:	Course TAs:	
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### Calendar Description:

Introduction to discrete mathematics, including propositional/Boolean logic, syntax and semantics, proof theory, and model theory; set theory, relations and functions, combinatorics (counting techniques, permutations, and combinations), graph theory. Applications in electrical, computing, and software engineering.

**Website:** <https://uwaterloo.ca/scholar/mcrowley/ece108>

**Textbook:** Thistle & Tripunitara, "Discrete Math & Logic".

Free text available as pdf (available on LEARN). Corrections and input always welcome, changes and updates will be posted to LEARN and git.

**Discussion Board:** via Piazza - <https://piazza.com/uwaterloo.ca/spring2020/ece108/home>

**Course Content:** via LEARN - <https://learn.uwaterloo.ca/d2l/home/546522>

## **Assessment:**

**30% Assignments** – to practice the concepts taught in class, the lowest assignment grade will be dropped.

**50% Quizzes** - on the content of the previous assignment, the lowest assignment grade will be dropped.

**20% Final Take Home Quizzignment** – bigger problems integrating concepts from across the course, limited timeline to submit online, carried out final week of classes.

## **Project: Video Game (optional programming activity):**

Early in June (exact timing to be determined) the people with Ideas Clinic are planning on hosting a multi-day, large team activity that involves programming, team work, large-scale software version control, and concepts from some of the courses you are all taking this term, including ECE 108. This is an ungraded (and thus optional) activity but for ECE 108 we will be coordinating our course schedule and deadlines so as not to add additional work that week if you choose to take part. We will discuss this more as it approaches.

## **Getting Help:**

- **Discussion board:** <https://piazza.com/uwaterloo.ca/spring2020/ece108/home>
  - Go there and sign up with your UWATERLOO email
- **Office Hours:**
  - Thursdays 10:00 - 11:00 Prof. Crowley or Thistle
  - Wednesdays 4:30-5:30 with a TA
  - Thursdays 4:30-5:30 with a TA
- **Weekly Live Wrapup**
  - Fridays 11:30-12:30 – live Q&A on Piazza or video session on Webex/Bongo
- **Lecture and Tutorial Videos:**
  - <https://www.youtube.com/channel/UCHqrRI12d0WtlyS-sECwkRQ>
- **Other Help:**
  - If you need any accommodations, or assistance with exams, learning environment, assignments, talk to this office and they can help anonymously.

## **Recipe for success:**

Watch the lectures. Do the assignments promptly. Use the discussion board. Watch the tutorials for more depth into the topics. Ask questions! Most of all, *have fun*.



## Content Schedule

<b>Week</b>	<b>Topics</b>	<b>Instructor</b>	<b>Assessments</b>
(1) May 11	Introduction, Propositional logic	Prof. Crowley	
(2) May 18	Proof techniques	Prof. Thistle	Q0: Short quiz on logic and arithmetic rules, comparators, basic concepts.
(3) May 25	Sets	Prof. Crowley	A1: on logic and proof techniques
(4) June 1	Ordered pairs, relations, functions	Prof. Crowley	Q2: on proof techniques
(5) June 8	Set cardinality	Prof. Thistle	Ideas Clinic?
(6) June 15	Relations in General	Prof. Thistle	A2: on sets, ordered pairs, functions, cardinality
(7) June 22	Combinatorics		Q3: on sets, ordered pairs, relations, functions
(8) June 29	Counting, Probability		A4: relations, combinatorics
(9) July 6	Probability	Prof. Crowley	Q4: relations, combinatorics
(10) July 13	Probability, Expectation	Prof. Crowley	A5: on probability
(11) July 20	BUFFER		Q5: on probability
(12) July 27	REVIEW		
(13) Aug 5			Take Home Exam: on all of course

\* The instructors reserve the right to diverge somewhat from this schedule if needed. All efforts will be made to cover the content required for later courses, so if some extra time is taken in early sections, some less critical topics may be covered briefly or skipped.

## Assessment

## **Assignments:**

Assignments are your chance to learn by using the concepts in class, discussing ideas and finding solutions. Assignments will be marked leniently but will be done individually and checked rigorously for collaboration. Use them to your advantage for practice. Solutions will be posted to Learn after the submission deadline.

## **Quizzes:**

- The week after each assignment, there will be a quiz on the same content to assess your knowledge.
- The quizzes will be carried out in a time-limited quiz format with randomized questions through LEARN or Mobius.
- Note that the first quiz, Q0, will be more focused on gauging your background knowledge and checking our online mechanisms for administering quizzes.

**Lateness policy:** No late submissions will be accepted. However, your lowest scoring assignment will be dropped from consideration.

**Collaboration:** Discussion of assignments with your classmates and with your TAs and Prof are encouraged to understand the material. But assignments *must be answered independently*. After any discussion you should go away and on your own come up with the answer based on your new understanding. Each student will download the pdf for the assignment from crowdmark and complete it by hand, then scan or take a photograph of the pages to submit back to crowdmark. This system allows the Teaching Assistants and Prof to easily grade each question in succession and to easily compare between assignments to look for signs of cheating. See the Academic Integrity section for process and repercussions for cheating on any graded assessments at Waterloo.

## **Policies and Rules**

### **COVID-19:**

Please read through the policy documents and announcements at <https://uwaterloo.ca/coronavirus/academic-information> to keep up to date with your rights and responsibilities in this challenging time. Keep in mind that your health, both physical and mental, should be your primary concern. Don't hesitate to contact any course or First Year Engineering staff for help. However, the standards of Waterloo Engineering are not changed because of this situation, you should utilize all of the tools given to you to learn and excel in this environment as much as possible.

### **Academic Integrity:**

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. Check <https://uwaterloo.ca/academic-integrity/> for more information.

### **Grievance:**

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

### **Discipline:**

A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>. For typical penalties check Guidelines for the Assessment of Penalties, <http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm>. Plagiarism-detection software may be used on any submitted work.

### **Appeals:**

A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student

who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.

**Note for students with disabilities:**

The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.