Toronto Metropolitan University

Department of Electrical, Computer, & Biomedical Engineering
Faculty of Engineering & Architectural Science

Course Outline (W2025)

ELE302: Electric Networks

Instructor(s)	Arman Aghaee [Coordinator] Office: EPH426 Phone: TBA Email: arman.aghaee@torontomu.ca Office Hours: Fridays 10 AM - 11 AM
Calendar Description	This course builds on the introductory course ELE202 in electric circuit analysis. The course topics include a brief overview of circuit variables, elements, laws and theorems; mutual inductance and the ideal transformer model; 3-phase circuits; the operational amplifier as an active circuit element. Also, simple opamp circuits, the Laplace transform with applications to differential equations and electric circuits, frequency responses, Bode plots, resonant circuits, Fourier series; two port networks, and network parameters for interconnection of two-port networks; use of PSpice simulation software to solve circuit problems.
Prerequisites	CHY 102, MTH 140, MTH 141, PCS 125, PCS 211, CPS 125, ELE 202, MTH 240
Antirequisites	None
Corerequisites	MTH 312
Compulsory Text(s):	1. Fundamentals of Electric Circuits by Charles Alexander and Mathew Sadiku, 6th Edition, McGraw Hill.
Reference Text(s):	1. None
Learning Objectives (Indicators)	At the end of this course, the successful student will be able to: 1. Learns to model transients in second order electric circuits. Learns frequency response in passive circuits and learns to analyze them using core mathematical techniques. (**1c**) 2. Learns various circuit analysis and design techniques including Time, Frequency, Laplace and Fourier domain analysis techniques. (**2b**) 3. Conducting experiments/measurement. (**5a**) 4. Interpreting and analyzing data. (**5b**) **NOTE:***Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board (CEAB).*
Course Organization	4.0 hours of lecture per week for 13 weeks 3.0 hours of lab per week for 12 weeks 0.0 hours of tutorial per week for 12 weeks
Teaching Assistants	Negar Karimpour Suren Saleminezhad

Course Evaluation	<table><tr><th>Theory</th><th></th></tr><tr><td>Tutorial Quizzes</td><td>20 %</td></tr><tr><td>Midterm Test</td><td>25 %</td></tr><tr><td>Final Exam</td><td>35 %</td></tr><tr><th>Laboratory</th><th></th></tr><tr><td>Lab performance</td><td>20 %</td></tr><tr><td>TOTAL:</td><td>100 %</td></tr></table> **Note:** In order for a student to pass a course, a minimum overall course mark of 50% must be obtained. In addition, for courses that have both **"Theory and Laboratory"** components, the student must pass the Laboratory and Theory portions separately by achieving a minimum of 50% in the combined Laboratory components and 50% in the combined Theory components. Please refer to the **"Course Evaluation"** section above for details on the Theory and Laboratory components (if applicable).
Examinations	Midterm is closed book during class hours for 1.5 hours. It covers all material taught. It comprises of 3 questions with subsections. Final Exam is closed book for 2 hours. It covers all material taught after the Midterm. It comprises of 4 questions with subsections. If a midterm exam is missed due to verified medical or personal circumstances (with an approved ACR), the student must inform the instructor to arrange a make-up exam. If a lab or tutorial is missed due to verified medical or personal circumstances (with an approved ACR), the student must notify both the TA and the instructor to arrange a make-up or determine if the grade can be redistributed to other components.
Other Evaluation Information	In order for a student to pass a course, a minimum overall course mark of 50% must be obtained. In addition, for courses that have both "Theory and Laboratory" components, the student must pass the Laboratory and Theory portions separately by achieving a minimum of 50% in the combined Laboratory components and 50% in the combined Theory components. Please refer to the "Course Evaluation" section above for details on the Theory and Laboratory components.
Teaching Methods	In person Lectures, Tutorials, and Labs.
Other Information	None

Course Content

Week	Hours	Chapters / Section	Topic, description

Week 1	4	5	Operational Amplifiers
Week 2-3	8	8	Second Order Circuits
Week 4-5	8	14	Frequency Response
Week 6-7	8	15 & 16	Laplace Transforms
Week 8	4	13	Magnetically Coupled Circuits
Week 9	4	12	Three-Phase Circuits
Week 10-11	8	17	Fourier Series
Week 12	4	19	Two Port Networks

Laboratory(L)/Tutorials(T)/Activity(A) Schedule

Week	L/T/A	Description
1	No Lab	No Lab/Tutorial
2	Exp 1	Expt-1: OPAMP circuits: Prelab Assignment and Lab Procedure Step 1 to 4
3	Exp 1	Expt-1: OPAMP circuits: Lab Procedure Step 5 to 13 and Post-Lab Questions

4	Tutorial 1	Chapter 5 OPAMP
5	Exp 2	Expt-2: Step Response, 1st & 2nd order circuits
6	Tutorial 2	Chapter 8 Second Order Circuit
7	Midterm	Midterm Week: No labs and tutorials
8	Tutorial 3	Chapter 14 Frequency Response
9	Exp 3	Expt-3: Frequency Response
10	Tutorial 4	Chapters 15 and 16 Laplace Transforms
11	Exp 4	Expt-4: Filters (Ch-14)
12	Exp 5	Expt-5: Mutual Inductance (Ch-13)
13	No Lab	No Lab/Tutorial

University Policies & Important Information

Students are reminded that they are required to adhere to all relevant university policies found in their online course shell in D2L and/or on the Senate website

Refer to the Departmental FAQ page for furhter information on common questions.

Important Resources Available at Toronto Metropolitan University

- The Library provides research workshops and individual assistance. If the University is open, there is a Research Help desk on the second floor of the library, or students can use the Library's virtual research help service to speak with a librarian.
- Student Life and Learning Support offers group-based and individual help with writing, math, study skills, and transition support, as well as resources and checklists to support students as online learners.

- You can submit an Academic Consideration Request when an extenuating circumstance has occurred that has significantly impacted your ability to fulfill an academic requirement. You may always visit the Senate website and select the blue radio button on the top right hand side entitled: **Academic Consideration Request (ACR)** to submit this request.

  For Extenuating Circumstances, Policy 167: Academic Consideration allows for a once per semester ACR request without supporting documentation if the absence is less than 3 days in duration and is not for a final exam/final assessment. Absences more than 3 days in duration and those that involve a final exam/final assessment, require documentation. Students must notify their instructor once a request for academic consideration is submitted. See Senate Policy 167: Academic Consideration.

- If taking a remote course, familiarize yourself with the tools you will need to use for remote learning. The Remote Learning Guide for students includes guides to completing quizzes or exams in D2L Brightspace, with or without Respondus LockDown Browser and Monitor, using D2L Brightspace, joining online meetings or lectures, and collaborating with the Google Suite.

- Information on Copyright for Faculty and students.

Accessibility

- Similar to an accessibility statement, use this section to describe your commitment to making this course accessible to students with disabilities. Improving the accessibility of your course helps minimize the need for accommodation.
- Outline any technologies used in this course and any known accessibility features or barriers (if applicable).
- Describe how a student should contact you if they discover an accessibility barrier with any course materials or technologies.

Academic Accommodation Support

Academic Accommodation Support (AAS) is the university's disability services office. AAS works directly with incoming and returning students looking for help with their academic accommodations. AAS works with any student who requires academic accommodation regardless of program or course load.

- Learn more about Academic Accommodation Support.
- Learn how to register with AAS.

Academic Accommodations (for students with disabilities) and Academic Consideration (for students faced with extenuating circumstances that can include short-term health issues) are governed by two different university policies. Learn more about Academic Accommodations versus Academic Consideration and how to access each.

Wellbeing Support

At Toronto Metropolitan University, we recognize that things can come up throughout the term that may interfere with a student's ability to succeed in their coursework. These circumstances are outside of one's control and can have a serious impact on physical and mental well-being. Seeking help can be a challenge, especially in those times of crisis.

If you are experiencing a mental health crisis, please call 911 and go to the nearest hospital emergency room. You can also access these outside resources at anytime:

- **Distress Line:**24/7 line for if you are in crisis, feeling suicidal or in need of emotional support (phone: 416-408-4357)
- **Good2Talk:**24/7-hour line for postsecondary students (phone: 1-866-925-5454)
- **Keep.meSAFE:** 24/7 access to confidential support through counsellors via My SSP app or 1-844-451-9700

If non-crisis support is needed, you can access these campus resources:

- **Centre for Student Development and Counselling:** 416-979-5195 or email csdc@torontomu.ca
- **Consent Comes First - Office of Sexual Violence Support and Education:** 416-919-5000 ext 3596 or email osvse@torontomu.ca
- **Medical Centre:** call (416) 979-5070 to book an appointment

We encourage all Toronto Metropolitan University community members to access available resources to ensure support is reachable. You can find more resources available through the Toronto Metropolitan University Mental Health and Wellbeing website.