



Course Outline

Instructors

- Prof. Sherif Sherif, P.Eng. (A01)
E3-509 EITC
(204) 474-6893
Sherif.Sherif@umanitoba.ca
- Prof. Arkady Major, P.Eng. (A02)
E3-559 EITC
(204) 474-7541
A.Major@umanitoba.ca

Office Hours

- By appointment

Teaching Assistant

- Monsurul Alam
alama@myumanitoba.ca
- Behnan Arzhang
arzhang1@myumanitoba.ca
- Jasmine Cochingco
cochingj@myumanitoba.ca
- Avishek Ghosh
ghosha3@myumanitoba.ca
- Fatemeh Gordannejad
Fatemeh.Gorgannejad@umanitoba.ca
- Mohammad Reza
rezamar@myumanitoba.ca

Contact Hours

- 3 credit hours
- Lectures:
3 hours x 13 weeks/term = 39 hours
- Laboratories:
3 hours x 10 weeks = 30 hours

Prerequisites:

- Minimum grade of 60% in Pre-Calculus Mathematics 40S (or the former Mathematics 40S), Physics 40S, and Chemistry 40S

Course Website:

<http://umanitoba.ca/umlearn>

Important Dates

- **Term Test**
Tuesday, March 9th, 2021
6:30PM – 8:00PM
- **Voluntary Withdrawal Deadline**
March 31st, 2021
- **Louis Riel Day**
February 15th, 2021
No classes or examinations
- **Spring Break**
February 16th – 19th, 2021
No classes or examinations
- **Good Friday**
April 2nd, 2021
No classes or examinations

ENG 1450 – Introduction to Electrical & Computer Engineering

Winter 2021

IMPORTANT NOTICE – Mandatory Requirement to Report

This course will be conducted using remote instruction. Students who are accessing the course from outside of Canada or the USA **must notify the instructor** and indicate in which country they are located. Access to software may be restricted from some countries and failure to comply with these restrictions may result in criminal prosecution.

Course Objectives

This course introduces the fundamentals of electrical and computer engineering, including circuit analysis and selected topics on digital logic and electric motors. A number of standard electrical devices and components are presented in this course. The laboratory sessions involve the use of and familiarization with basic equipment and methods used in the workplace.

Course Content

The following topics will be covered:

- Fundamentals of electric circuits
- Kirchoff's laws, voltage and current division, independent sources
- Capacitors and inductors
- Sinusoidal AC circuits
- Introduction to operational amplifiers, semiconductor devices, optical devices, electric motors
- Boolean logic, logic gates, combinational logic.

Textbook

Fundamentals of Electric Circuit Analysis: Select Chapters. University of Manitoba, ENG1450, Wiley, 2017

Hwang: Digital Logic Design. Select Chapters. University of Manitoba, ENG1450, Nelson, 2017

Learning Outcomes

1. Understand fundamental circuit theory and apply elementary circuit reduction and energy conservation techniques in the DC analysis of RLC circuits.
2. Apply circuit analysis techniques to solve electric circuits containing energy storage elements (L and C) in the sinusoidal AC steady state (phasor analysis).
3. Understand the representation of numbers in binary and hexadecimal notation and simple arithmetic operations in these bases. Understand basic Boolean algebra and logic, and apply this knowledge through the use of truth tables to design simple logic circuits from a written/verbal explanation of a problem.
4. Hands-on measurement and development of electric and digital circuits in a range of applications spanning the discipline.

Expected Competency Levels

Outcome	KB	PA	IN	DE	ET	IT	CS	PR	IE	EE	EP	LL
1	2	4	2		3							
2	3	4	3		2							
3	2	2		3	2							
4	2	2	3	2	3	4	3		1		1	2

Accreditation Details

Accreditation Units

- Mathematics: 0%
- Natural Science: 0%
- Complementary Studies: 0%
- Engineering Science: 100%
- Engineering Design: 0%

Attributes

KB: A knowledge base for engineering
PA: Problem analysis
IN: Investigation
DE: Design
ET: Use of engineering tools
IT: Individual and team work
CS: Communication skills
PR: Professionalism
IE: Impact of engineering on society/
environment
EE: Ethics and equity
EP: Economics and project
management
LL: Life-long learning

Competency Levels

- 1 - Knowledge (Able to recall information)
- 2 - Comprehension (Ability to rephrase information)
- 3 - Application (Ability to apply knowledge in a new situation)
- 4 - Analysis (Able to break problem into its components and establish relationships.)
- 5 - Synthesis (Able to combine separate elements into a whole)
- 6 - Evaluation (Able to judge the worth of something)

Grading Scale

Letter	Mark
A+	95–100
A	85–94
B+	80–84
B	70–79
C+	65–69
C	55–64
D	45–54
F	< 45

Note: These boundaries represent a guide for the instructor and class alike. Provided that no individual student is disadvantaged, the instructor may vary any of these boundaries to ensure consistency of grading from year-to-year.

CEAB Graduate Attributes Assessed

KB.3 – Recalls and defines, and/or comprehends and applies information, first principles, and concept in fundamental engineering science.

IN.3 – Interprets results and reaches appropriate conclusions.

Evaluation

The final course grade is determined by the student's performance on assignments, in laboratories, and on tests and examinations. Students must complete all laboratories and receive a minimum grade of 50% on the final examination to be eligible for a passing grade in the course.

Component	Value (%)	Method of Feedback	Learning Outcomes Evaluated
Quizzes	0	F, S	1, 2, 3, 4
Laboratories	20	F, S	1, 2, 3, 4
Term Test	30	F, S	1, 2, 4
Final Examination	50	S	1, 2, 3, 4

* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the *General Academic Regulations on Academic Integrity*, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating by another student is also subject to serious academic penalty.

Requirements and Regulations

- Attendance at lectures and laboratories is essential for successful completion of this course. Students must satisfy each evaluation component in the course to receive a passing final grade.
- It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with the University's *General Academic Regulations*, as well as Section 3 of the Faculty of Engineering *Academic Regulations* dealing with incomplete term work, deferred examinations, attendance and withdrawal.
- No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, wireless communication or data storage devices) are allowed in examinations unless approved by the course instructor.
- Students should be aware that they have access to an extensive range of resources and support organizations. These include Academic Resources, Counselling, Advocacy and Accessibility Offices as well as documentation of key University policies e.g. Academic Integrity, Respectful Behaviour, Examinations and related matters.

 [Supplemental Information](#)

Copyright Notice

All materials provided in this course are copyright and are provided under the fair dealing provision of the Canadian Copyright Act. This material may not be redistributed in any manner without the express written permission of the relevant copyright holder.

Retention of Student Work

Students are advised that copies of their work submitted in completing course requirements (i.e. assignments, laboratory reports, project reports, test papers, examination papers, etc.) may be retained by the instructor and/or the department for the purpose of student assessment and grading, and to support the ongoing accreditation of each Engineering program. This material shall be handled in accordance with the University's *Intellectual Property Policy* and the protection of privacy provisions of *The Freedom of Information and Protection of Privacy Act (Manitoba)*. Students who do not wish to have their work retained must inform the Head of Department, in writing, at their earliest opportunity.