



Course Outline

Instructors

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Office Hours

- By appointment

Teaching Assistant

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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

Traditional Territories Acknowledgement

The University of Manitoba campuses are located on the original lands of the Anishinaabeg, Ininiwak, Anishinewuk, Dakota Oyate and Dene, and on the National Homeland of the Red River Métis.

We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

ENG 1450 – Introduction to Electrical & Computer Engineering

Winter 2025

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
- Kirchhoff'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	I	D	I		D							
2	D	D	D		I							
3	I	I		D	I							
4	I	I	D	I	D	D	D		I		I	I

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.

Important Dates

- **Term Test**
Thursday, February 28th, 2025
7:30PM–8:30PM
- **Voluntary Withdrawal Deadline**
March 19th, 2025
- **Louis Riel Day**
February 17th, 2025
No classes or examinations
- **Spring Break**
February 18th–21st, 2025
No classes or examinations
- **Good Friday**
April 18th, 2025
No classes or examinations

Accreditation Details

Accreditation Units

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

Graduate 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

I - Introduced (Introductory)
D - Developed (Intermediate)
A - Applied (Advanced)

Evaluation

The final course grade is determined by the student's performance in laboratories, the term test and final examination. 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)

Student Absences

Attendance in lectures, tutorials, and laboratories is mandatory. For short-term absences due to illness or other extenuating circumstances of 120 hours (5 days) or less, students are required to complete a *Self-Declaration Form for Brief or Temporary Absence* available on the University website. This form must be submitted to the course instructor within 48 hours of the absence. (No additional documentation is required.)

Note that students are responsible to complete any missed work and must consult with the instructor to make appropriate arrangements.

For absences longer than 120 hours, students must contact the instructor and ECE Undergraduate Advisor, Tammy Holowachuk (Tammy.Holowachuk@umanitoba.ca) for further instructions.

Deferred Final Examinations

Students who miss the regular scheduled writing of a final examination, for valid medical or compassionate reasons, may be given the opportunity to write a deferred examination, subject to approval by the Associate Dean (Undergraduate). All requests for a deferred examination must be made within 48 hours of the missed examination, and must follow the procedure described on the Faculty website, without exception. Course instructors do not have the discretion to grant deferred final examinations.

(<https://umanitoba.ca/engineering/student-experience#engineering-student-policies>)

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 Resources](#)

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

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.

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.

Copyright Notice

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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.