

ELEC ENG 40I6 A/B
Engineering Design

Course Outline

Please refer to course website for updated information.

COURSE DESCRIPTION

McMaster UG Calendar:

The design process; safety; a term project composed of small teams of students including an oral presentation and written report.
Lectures, tutorials, one capstone project; both terms.

Instructor: Drs. S. Shirani and C.-H. Chen

PRE-REQUISITES AND ANTI-REQUISITES

Prerequisite(s): Registration in Level IV or V of any Electrical or Computer Engineering program

Anti-requisite(s): ELECENG 4BI6 A/B, ENGINEER 4MO6 A/B, IBEHS 5PO6 A/B

SCHEDULE And MODE OF DELIVERY

C01:

Lectures: *Fall term* – Mondays, Wednesdays, and Thursdays 10:30-11:20
Winter term – Mondays, Wednesdays and Thursdays 10:30-11:20

Tutorials: *Fall term* – Mondays and Thursdays 9:30-10:20
Winter term – Wednesdays 9:30-10:20

Labs: Monday to Friday afternoons from 14:30 to 17:30, Wednesday and Thursday evenings from 18:30 to 21:20. Students can use the lab as a design/project space to work on their projects.

C02:

Lectures: *Fall term* – Mondays, Wednesdays, and Thursdays 10:30 – 11:20
Winter term – Mondays, Wednesdays, and Thursdays 10:30 – 11:20

Tutorials: *Fall term* – Monday and Thursday 9:30 – 10:20
Winter term - Wednesdays 9:30 – 10:20

Labs: Monday to Friday from 14:30 to 17:30, Wednesday and Thursday evenings from 18:30 to 21:20. Students can use the lab as a design/project space to work on their projects.

INSTRUCTORS

C01 - Fall & Winter Term:

Dr. Shahram Shirani
ITB-A111
shirani@mcmaster.ca
905-525-9140 ext. 27943
Office Hours: By appointment

C02 – Fall & Winter Term:

Dr. Chih-Hung (James) Chen
ITB-A321
chench@mcmaster.ca
905-525-9140 ext. 27084
Office Hours: By appointment

TEACHING ASSISTANTS

Names, contact information, and office hours will be provided on the course website at Avenue to Learn (A2L).

COURSE WEBSITE/S

<http://avenue.mcmaster.ca>

COURSE OBJECTIVES

By the end of this course, students should be able to:

- Formulate an engineering problem in a precise manner understanding approximations and risks.
- Be able to select and apply appropriate materials and supplies to tackle design problem.

- Independently acquire knowledge from a variety of sources.
- Work in a group in an effective and efficient manner.
- Manage time effectively to achieve project goals.
- Clearly communicate engineering design work in both written and oral formats.
- Understand and articulate the impact of their work on society, environment and stakeholders.

CEAB GRADUATE ATTRIBUTES (GAs)

Note: The *Learning Outcomes* defined in this section are measured throughout the course and form part of the Department's continuous improvement process. They are a key component of the accreditation process for the program and will not be taken into consideration in determining a student's actual grade in the course. For more information on accreditation, please ask your instructor or visit:

<http://www.engineerscanada.ca>.

Outcomes	Indicators	Measurement Methods(s)
Justifies and reflects on design decisions, giving consideration to limitations, assumptions, constraints and other relevant factors.	4.4	all meetings, proposal, progress report, final report
Actively contributes to the planning and execution of a team project.	6.1	all meetings, progress report
Manages interpersonal relationships, taking leadership responsibilities as needed.	6.2	all meetings, progress report, final report
Demonstrates comprehension of technical and non-technical instructions and questions.	7.1	all meetings, proposal and progress presentations, Capstone EXPO
Composes an effective written document for the intended audience.	7.2	proposal, progress report, final report
Composes and delivers an effective oral presentation for the intended audience.	7.3	all meetings, proposal and progress presentations, Capstone EXPO
Evaluates the environmental impact of engineering activities, identifies uncertainties in decisions, and promotes sustainable design.	9.1	proposal, final report
Evaluates the social impact of engineering activities, including health, safety, legal, cultural, and other relevant	9.2	proposal, final report

factors, and identifies uncertainties in decisions.

Applies ethical frameworks and reasoning, including in situations where there are possible conflicting interests among the stakeholders.

10.1

all meetings, proposal

Applies the principles of equity and universal design to ensure equitable treatment of all stakeholders.

10.2

all meetings, proposal

Applies economic principles in decision making.

11.1

proposal, progress report, final report

Plans and effectively manages a project's time, resources, and scope, following business practices as appropriate.

11.2

all meetings, proposal, progress report, final report

Identifies, characterizes, assesses, and manages risks to project success.

11.3

all meetings, proposal, progress report, final report

Reflects on one's own educational needs and opportunities for growth.

12.1

progress report, final report

Seeks and acquires appropriate external information as required, including showing awareness of sources of information and ability to critically evaluate them.

12.2

proposal, progress report, final report

ASSUMED KNOWLEDGE

This course applies all acquired knowledge from the program.

COURSE MATERIALS

Required Texts: None

COURSE OVERVIEW

Date/Week	Topic	Readings
September	Form groups of <i>four</i> and submit the names of project partners via A2L. Students that do not have a group by September 16 will be assigned to groups and notified. Group formation will be finalized by September 18.	N/A

October	<i>Project Proposal Report and Presentation</i> - Each group must prepare a complete description of their project. A presentation to the class is required followed by questions regarding the design decisions. Presentation times will be the regular lecture and tutorial hours between September 28 and October 8. Proposal submission is through A2L by September 27.	N/A
November/December	<i>Meetings</i> - Each group will meet with the instructor at least biweekly to present the progress they have made their plan for the completion of the project.	N/A
Mid December	<i>Progress report</i> - A short progress report will be required from each group. It is expected that each group will have at least one third of its project's deliverables ready at this stage. Report submission is through A2L by December 10.	N/A
February to March	Groups will meet with the instructor to present their progress.	N/A
Early April	<i>Capstone Expo (Engineering Capstone Projects Showcase)</i> - The project exhibition will be in April. Final report should be submitted through A2L by April 7.	N/A

A more detailed timeline is available on the course website at Avenue to Learn.

At certain points in the course, it may make good sense to modify the schedule. The instructor may modify elements of the course and will notify students accordingly (in class, or on the course website at Avenue to Learn).

LABORATORY OPERATION

- Each student in the course is required to pass the lab safety quiz prior to using the lab. The lab safety material and quiz will be on Avenue to Learn.
- Access to all labs is restricted in the interest of security and safety. General information on accessing and using the lab can be found on the webpage: <https://www.eng.mcmaster.ca/ece/labs-and-health-safety#Labs-Access-and-Use>

ASSESSMENT

Component	Weight
Project proposal (report & presentation)	20%

Attending talks, proposal presentations and meetings with the instructor (fall term)	5%
Progress report and self-reflection	20%
Progress presentation and meetings with the instructor (winter term)	5%
Final report and the project	45%
A 4-6 minute video and the capstone day poster	5%
Total	100%

All projects must be done in groups of 4 students. Instructor's approval is required for groups with a smaller or larger number of students. Marks are assigned individually and not on a group basis. Grades may be adjusted based on individual contributions. A satisfactory final report must be submitted, else a grade of "F" in the course will be assigned.

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g., the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <https://secretariat.mcmaster.ca/university-policies-proceduresguidelines/>.

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g., the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g., A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software.

All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g., e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights

& Responsibilities (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online. It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in university activities. Student disruptions or behaviors that interfere with university functions on online platforms (e.g., use of Avenue to Learn, WebEx, or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

ACADEMIC ACCOMMODATIONS

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.

Students requiring academic accommodation based on religious, indigenous, or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar’s Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

EXTREME CIRCUMSTANCES

The instructors and university reserve the right to modify elements of the course during the term. The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labor disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn, and/or McMaster email.

Electrical and Computer Engineering Lab Safety

Information for Laboratory Safety and Important Contacts

This document provides important information for the healthy and safe operation of ECE instructional laboratories. This document is required reading for all laboratory supervisors, instructors, researchers, staff, and students working in or managing instructional laboratories in ECE. It is expected that revisions and updates to this document will be done continually. A McMaster University lab manual is also available to read in every laboratory and online

<https://hr.mcmaster.ca/app/uploads/2019/07/2019-McMaster-Lab-Manual.pdf>

General Health and Safety Principles

Good laboratory practice requires that every laboratory worker and supervisor observe the following whether conducting lab work at school or at home:

1. Food and beverages are not permitted in the instructional laboratories.
2. A Laboratory Information Sheet on each lab door identifying potential hazards and emergency contact names should be known.
3. Laboratory equipment should only be used for its designed purpose.
4. Proper and safe use of lab equipment should be known before using it.
5. The course TA leading the lab should be informed of any unsafe condition.
6. The location and correct use of all available safety equipment should be known.
7. Potential hazards and appropriate safety precautions should be determined, and sufficiency of existing safety equipment should be confirmed before beginning new operations.
8. Proper waste disposal procedures should be followed.
9. Personal ergonomics should be practiced when conducting lab work.
<https://bit.ly/3fOE71E>
10. Current University health and safety issues, and protocol should be known.
<https://hr.mcmaster.ca/resources/covid19/workplace-health-and-safety-guidance-during-covid-19/>

Location of Safety Equipment

Fire Extinguisher

On walls in halls outside of labs

Telephone

First Aid Kit

ITB A111, or dial “88” after 4:30 p.m.

Fire Alarm Pulls

On the wall of every lab near the door

Near all building exit doors on all floors

Who to Contact

Emergency Medical / Security: On McMaster University campus, call Security at extension **88** or **905-522-4135** from a cell phone.

Non-Emergency Accident or Incident: Immediately inform the TA on duty or Course Instructor.

University Security (Enquiries / Non-Emergency): Dial 24281 on a McMaster phone or dial 905-525-9140 ext. 24281 from a cell phone.

See TA or Instructor: For problems with heat, ventilation, fire extinguishers, or immediate repairs

Environmental & Occupational Health Support Services (EOHSS): For health and safety questions dial 24352 on a McMaster phone or dial 905-525-9140 ext. 24352 from a cell phone.

ECE Specific Instructional Laboratory Concerns: For non-emergency questions specific to the ECE laboratories, please contact 24103.

In Case of a Fire (On Campus Dial 88)

When calling to report a fire, give name, exact location, and building.

1. Immediately vacate the building via the nearest Exit Route. Do not use elevators!
2. Everyone is responsible for knowing the location of the nearest fire extinguisher, the fire alarm, and the nearest fire escape.
3. The safety of all people in the vicinity of a fire is of foremost importance. But do not endanger yourself!
4. In the event of a fire in your work area shout "*Fire!*" and pull the nearest fire alarm.
5. Do not attempt to extinguish a fire unless you are confident it can be done in a prompt and safe manner utilizing a hand-held fire extinguisher. Use the appropriate fire extinguisher for the specific type of fire. Most labs are equipped with Class A, B, and C extinguishers. Do not attempt to extinguish Class D fires which involve combustible metals such as magnesium, titanium, sodium, potassium, zirconium, lithium, and any other finely divided metals which are oxidizable. Use a fire sand bucket for Class D fires.
6. Do not attempt to fight a major fire on your own.
7. If possible, make sure the room is evacuated; close but do not lock the door and safely exit the building.

Clothing on Fire

Do not use a fire extinguisher on people

1. Douse with water from safety shower immediately or
2. Roll on floor and scream for help or
3. Wrap with fire blanket to smother flame (a coat or other nonflammable fiber may be used if blanket is unavailable). Do not wrap a standing person; rather, lay the victim down to extinguish the fire. The blanket should be removed once the fire is out to

disperse the heat.

Equipment Failure or Hazard

Failure of equipment may be indicative of a safety hazard - You must report all incidents.

Should you observe excessive heat, excessive noise, damage, and/or abnormal behaviour of the lab equipment:

1. Immediately discontinue use of the equipment.
2. In power labs, press wall-mounted emergency shut-off button.
3. Inform your TA of the problem.
4. Wait for further instructions from your TA.
5. TA must file an incident report.

Protocol For Safe Laboratory Practice

Leave equipment in a safe state for the next person - if you are not sure, ask!
When in doubt, consult the course TA.

Defined Roles

TA	The first point of contact for lab supervision	
ECE Lab Supervisor	Steve Spencer - ITB 147	steve@mail.ece.mcmaster.ca
ECE Chair	Mohamed Bakr - ITB A111	mbakr@mcmaster.ca
ECE Administrator	Shelby Gaudrault - ITB A111	gaudraus@mcmaster.ca
ECE Course Instructor	Please contact your specific course instructor directly	

www.eng.mcmaster.ca/ece