

# MECH ENG 4B03

## Topics in Product Development – Fall 2023

Instructor: Dr. Elizabeth Hassan

Email: [hassae3@mcmaster.ca](mailto:hassae3@mcmaster.ca)

The information in this course outline is accurate at the time of writing but may be modified at the instructor's discretion. Any modifications will be made with an effort to minimize disruptions to student learning.

**This course is being delivered fully in-person.**

### Lecture:

Lecture	Location
Mon, Wed, Thu 1330-1420	Per Mosaic

### Tutorial : Starting September 12

Section	Time	Room	TAs:
T01	Thu 1030	Per Mosaic	Andres Hurtado Carreon <a href="mailto:hurtada@mcmaster.ca">hurtada@mcmaster.ca</a>
T02	Tu 1130	Per Mosaic	Braeden Cooke <a href="mailto:cookeb3@mcmaster.ca">cookeb3@mcmaster.ca</a>
T03	Tu 1030	Per Mosaic	

You must attend your section as specified on Mosaic, and your team must all attend the same section. **Book time with TAs via spreadsheet on Avenue**

**Office hours:** 1230-1400 Tuesday

Office location posted on Avenue or call Dr. Hassan on Teams

“Office hours” are when I am planning to be there and available to work with students. You can come for feedback on an assignment before you submit, ask questions about something we covered in lecture, get help with a design problem with your project, get advice on problems with your group, or anything else that you would like my help with.

## Communication Guidelines:

- I'm usually very quick to respond to email or Teams messages during the work day (when I'm not in lecture), I'm slower evenings and weekends. Generally you can expect that email will be replied to within 24h, but please include the course code (4B03) in the subject line for quickest response, and follow these guidelines:

Topic	Contact
General Inquiries	Dr Hassan email or Teams message
In class questions	Before, during or after class
Mark adjustments, grading questions	Dr. Hassan email only, please do not use Microsoft Teams

- I will set up a Microsoft Teams for lecture backup in case of instructor illness. Class announcements and materials will be posted on Avenue, not Teams.
- If you need to see Dr. Hassan directly, you can come to open office hours, or call on Microsoft Teams or make an appointment via email. Appointments outside office hours are very limited due to my heavy teaching schedule this term, please use office hours as much as you can.
- During a video call/meeting/class my camera will always be on, but your camera never needs to be, there's no need to show your face unless you want to.

## Learning Outcomes:

By the end of the MECENG 4B03, the student should be able to:

1. Work as an effective team member on a design project.
2. Generate multiple design alternatives.
3. Seek out and analyze user insights for product development
4. Develop a strong financial justification for their design
5. Present their design solution to an audience, verbally, with images and in writing.

## Equipment/Text:

- **There is no textbook for this course**, my notes should be sufficient, posted on Avenue.
- For producing your prototype, you may use your own device with Autodesk Inventor (download for free at [autodesk.ca](http://autodesk.ca)). If you cannot use the software due to system

limitations, you can access the Mechanical Engineering computer lab remotely; instructions will be posted on Avenue.

- You can use any CAD package you wish, but the TAs and I can only support Inventor, and make sure your choice of software doesn't exclude your group members.
- You will have a shop materials budget for the project, you are welcome to use any additional materials you wish.
- Participation in lecture will periodically be assessed by in-class small assignments using Avenue. This will often require hand sketching of some kind, either on paper with pencil or a digital tablet (e.g. iPad, Wacom tablet). As long as the drawing is legible, either paper or digital is acceptable. Please have the equipment required to hand sketch ready for each lecture session.
- Course materials will be posted on Avenue. Please check your McMaster email for updates.

## Course policies:

- Lectures and tutorial will be in person. No streaming or recording will be made.
- Attendance at lectures is encouraged because of the in-class work (e.g. project work, feedback on design reviews). Occasional absences are fine, but consistently missing class will make it hard to do well in the course.
- It is YOUR responsibility to ensure that you are available with your team for design reviews. **Attendance at your team's design review sessions DR1, DR2, DR3 is mandatory.** The particular day your review occurs will be chosen by the groups on a first come, first served basis, you have no guarantee of your choice of day. These are booked on a spreadsheet on Avenue.
- For the tutorial sessions your group will book time with a TA on the posted spreadsheet on Avenue.
- **Attendance at tutorial sessions is mandatory** so that you can meet with a TA for mini design reviews. You can miss one mini design review per term without penalty.
- In class assignments will be graded as 0/1= poor, 0.5/1: marginal, 1/1: good
- You will have 24 hours after lecture to hand in in class assignments to accommodate poor internet, or periodic schedule conflicts.

- No extensions or grace period will be granted for these in class assignments, but your lowest 20% of in-class assignments will be dropped. For example, if 15 assignments are handed in during the term, I will drop your worst 3.
  - The purpose of this scale to reward consistent participation. Even if you are not always correct or present, you can still achieve a high participation grade (since “perfect” is actually 80%)

## Assignment Policies:

- This class is a mix of group and individual work.
- There are no exams in this class, therefore it is imperative that you treat the projects and assignments with the same care and attention as you would an exam since they are worth similar amounts to exams.
- All submissions must be digital, pdf format via Avenue. **Make sure that photos, scans or pdfs of your drawings are legible** so the TAs can grade them. Illegible work will receive a grade of 0.
- **Grace period:** You can hand in most assignments **up to one week late** with no penalty and no need to contact Dr. Hassan, the Avenue dropbox will simply remain open. If due to serious illness, you require more time than the one-week grace period due for your submissions, contact Dr. Hassan.
  - I implemented this policy because I want to grade your best work and I care about your stress level.
  - Use the grace period for any reason, no questions asked. If you think it's a good reason to hand in up to a week late, it probably is.
  - This is intended for the big and little things that happen in all our lives from time to time: you have a minor illness, you don't want to miss your mom's birthday, you have to work at your job, your varsity team has a game, you have a midterm in another class, your laptop breaks etc.
  - Things that affect our ability to hand in work happen to all of us at some point, so I'm extending you a bit of “grace” with this policy. In return, I ask that you do the same to your teammates and treat each other kindly as you work together.
  - Please note: At the end of the grace period (1 week for assignment and project work, 24h for in class assignments), the dropbox will close, any assignment not submitted will be considered late and will receive a zero.

- DO NOT EMAIL work to me or the TAs, even if you miss the deadline. I never accept work via email or Teams, **only** via Avenue.
  - Why? Grading work outside of Avenue is undesirable for a number of reasons (record keeping, accreditation, fairness, efficiency). It makes it harder on everyone when submission guidelines are not followed
- Rubric feedback will be posted on Avenue, if after reviewing the guide you think that your assignment has a grading error, send me (Dr. Hassan) an email **detailing the error specifically** and I will re-grade your work.
  - Keep in mind that I will re-grade the entire assignment, not just the criteria that you have identified. If that re-grading yields a lower grade, I will not adjust your grade, but if it yields a higher one I will. **Questioning your grade will never result in a penalty for you.**
  - Regrading requests sometimes take longer than other emails because they require more thought and consideration.
- A MSAF results in an additional one week to complete your work, not cancellation of that work.
- **All course work MUST be handed in by the end of day (midnight) on December 12, 2023, no extensions.**

## Use of AI:

**Students are not permitted to use generative AI in this course.** In alignment with McMaster academic integrity policy, it “shall be an offence knowingly to … submit academic work for assessment that was purchased or acquired from another source”. This includes work created by generative AI tools. Also state in the policy is the following, “Contract Cheating is the act of “outsourcing of student work to third parties” (Lancaster & Clarke, 2016, p. 639) with or without payment.” Using Generative AI tools is a form of contract cheating. Charges of academic dishonesty will be brought forward to the Office of Academic Integrity.

This includes the use of AI to generate ideas, sketches or renders for any purpose in this course.

## **About the group project:**

- The 4B03 project is done in **groups of 4**. You may choose your own groups as long as everyone is in the same lab section on Mosaic. I cannot help you to change sections on Mosaic, it's beyond my control.
- I reserve the right to add or remove team members to meet everyone's needs.
- Your task is to develop a commercially viable product based on customer insights, test it, "prototype" it and develop a business model for it.
- You will present the stages of your work at 3 design reviews in class, and mini design reviews with your TA. Your work will be evaluated on each of these occasions.

## **Teamwork:**

- Teamwork is a critical part of this class and a critical part of engineering practice.
- Insufficient contributions to your team project **are a form of academic dishonesty** and will be dealt with accordingly.
- Harassing or abusive conduct is prohibited by your student code of conduct. There is zero tolerance for harassment or abusive conduct in my class.

## Course Grade Breakdown:

The due dates listed are the EARLIEST possible date the deliverable will be due, dropboxes close at midnight on due date + 1 week grace period unless otherwise noted. I may adjust the due dates during the term to better allow you to complete your work, those will be reflected on Avenue.

	Due	Value
<b>Individual Deliverables</b>		
In class assignments	in class on avenue + 24h grace	5%
Individual Project :	Submit pdf on avenue	
A1 - Problem identification and concept drawings	6 Oct	10%
A2 – Testing report	3 Nov	15%
A3 – Financial and manufacturing analysis	24 Nov	15%
<b>Group Deliverables</b>		
Weekly design reviews with TA	Weekly in tutorial	5%
Design Reviews:		
DR1 – Problem and customer	In class and tutorial week of 25 Sep	5%
DR2 – Form and function	In class and tutorial week of 23 Oct	10%
DR3 - Final Pitch, business model	In class and tutorial week of 27 Nov + 4 Dec	10%
Final project report and prototype	Submit pdf on avenue, due Dec 6 (grace period ends 12 Dec)	25%
<b>Total</b>		<b>100 %</b>

## Weekly Plan:

Deadlines are the earliest an assignment can be due, I may adjust later if necessary.  
 Lecture topic schedule is approximate and may be adjusted based on class progress.

Week of		Lecture	Lab	Hand In, Due Friday midnight
<b>0</b>	4-Sep	Intro, Concepts	No lab, form teams	
<b>1</b>	11-Sep	User insights, part design	Mini DR1	
<b>2</b>	18-Sep	Aesthetics	Mini DR2	
<b>3</b>	25-Sep	Design Review 1	Design Review 1	
<b>4</b>	2-Oct	Ergonomics and design for 3d printing	Mini DR3	Individual Prototype parts, A1
<b>Reading Week – Enjoy yourselves</b>				
<b>5</b>	16-Oct	Testing, Business Model	Mini DR4	
<b>6</b>	23-Oct	Design Review 2	Design Review 2	
<b>7</b>	30-Oct	Finance	Mini DR5	A2
<b>8</b>	6-Nov	Manufacturing	Mini DR6	
<b>9</b>	13-Nov	Venture capital and Liability	Mini DR7	
<b>10</b>	20-Nov	Design for the environment	Mini DR8	A3
<b>11</b>	27-Nov	Design Review 3	Design Review 3	
<b>12</b>	4-Dec	Design Review 3	Design Review 3	Group Final Report
<b>Hand in all work no later than midnight EST Dec 12 2023 *No Extensions*</b>				

## COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

### 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-procedures-guidelines/>

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](http://www.mcmaster.ca/academicintegrity).

### COURSES WITH AN ON-LINE ELEMENT

*Some courses may* use on-line elements (e.g. e-mail, Avenue to Learn (A2L), 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.

### ONLINE PROCTORING

*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.

## 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 behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 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 ACCOMMODATION OF STUDENTS WITH DISABILITIES

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

## REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM 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".

## ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

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.

## 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.

## EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

# STUDENT SUPPORTS

## INDIGENOUS STUDENTS

## INTERNATIONAL STUDENTS

## WELLNESS

### Student Wellness Centre

On-Campus Support for Medical and Mental Health Concerns. Doctors and Counsellors available.  
Located in PGCL, 2nd Floor.

**Mon-Fri 9AM-5PM 905-525-9140 ext. 27700**

<https://wellness.mcmaster.ca/contact-us/>

### Main St. West Urgent Care Centre

For immediate health concerns that do not require the emergency room.

**690 Main St W - Mon-Sun 9AM-9PM**

### Emergency Rooms

For **immediate, serious** health concerns.

#### St. Joseph's Healthcare Hamilton

50 Charlton Ave E

#### McMaster Children's Hospital

Students 17 and under

### Telehealth Ontario

Telehealth Ontario is a free, confidential service you can call to get health advice or information. A Registered Nurse will take your call 24 hours a day, seven days a week.

**Toll-free: 1-866-797-0000 Toll-free TTY: 1-866-797-0007**

### Phone Lines

#### Good2Talk

Confidential helpline providing professional counselling, info and referrals for mental health, addiction, and well-being

**1-866-925-5454**

#### LGBT Youthline

Confidential, non-judgemental & informed LGBTQQ2SI peer support.

**Sun-Fri, 4-9:30 PM, Text 647-694-4275**

#### SACHA (SEXUAL ASSAULT CENTRE - HAMILTON AREA)

Confidential, anonymous 24-hour nonjudgmental telephone support for adults who have experienced sexual violence at any point in their lives; will provide accompaniment to hospital or police station for survivors wishing to seek medical attention or report; counselling services & public education

**905-525-4162**

#### Empower Me (Graduate Students)

24/7 accessible counselling services to empower you to thrive, crisis support, mental health and well-being services.

**1-844-741-6389**

#### Bounceback

CBT skills-building for mild to moderate depression and anxiety for people 15 or older. If accessed through self-referral, the client's primary care provider will be notified.

**1-866-345-0224**

### Indigenous Student Services

Academic & social counselling, employment aid

LRW 1010

**ext. 23788**

[indigenous.admin@mcmaster.ca](mailto:indigenous.admin@mcmaster.ca)

[indigenous.mcmaster.ca](http://indigenous.mcmaster.ca)

### International Student Services

Advising services for international students and exchange students

GH 104

**ext. 24254**

[iss@mcmaster.ca](mailto:iss@mcmaster.ca)

[iss.mcmaster.ca](http://iss.mcmaster.ca)

# STUDENT SUPPORTS

## ACADEMIC

### **Student Success Centre**

Academic skills assistance, job search, volunteering  
GH 110  
**ext. 24254**  
**studentsuccess@mcmaster.ca**

### **Student Accessibility Services**

Disability services, assistive technology support  
MUSC B107  
**ext. 28652**  
**sas@mcmaster.ca**

### **TutorOcean**

Student to Student Tutoring Services  
<https://mcmaster.tutorocean.com/>

## FINANCIAL

### **Office of Student Financial aid and Scholarships**

Emergency funding, government funds, OSAP assistance, scholarships, work programs  
GH 120  
**ext. 24319**  
<https://registrar.mcmaster.ca/aid-awards/>

## FOOD

### **Food Collective Centre (FKA Mac Bread Bin)**

The Food Collective Centre is a service run by students dedicated to cultivating stronger food systems in the McMaster and surrounding community. (MSU Service)  
**macbreadbin@msu.mcmaster.ca**  
<https://www.msumcmaster.ca/services-directory/14-food-collective-centre>

### **Neighbour 2 Neighbour**

Food bank, community kitchen, community counselling, help with paying for utilities, and more. Hamilton Mountain.  
**905-574-1334**    <http://www.n2ncentre.com/>

## CRISIS SUPPORT

### **Barrett Centre for Crisis Support**

Provides a safe environment in the community and responds to the needs of individuals, 16 years of age or older, who experience a mental health crisis and do not require a hospital stay. Confidential and free services 24/7/365

**24 Hour Crisis Line: 905-529-7878, Toll Free: 1-844-777-3571**

### **COAST (Crisis Outreach and Support Team)**

Hamilton's crisis line is answered 24 hours a day, 7 days a week. The COAST mobile team, consisting of a mental health worker, and a police officer, will respond to crisis calls between the hours of 8 a.m. and 1 a.m. daily.

**905-972-8338**

### **Oakville Distress Centre**

Distress Centre Halton provides telephone and online support to people to better cope with crisis, loneliness, and emotional stress. Also serves the Hamilton area.

**905-849-4541**

### **Assaulted Women's Helpline**

Free, anonymous and confidential telephone and TTY crisis telephone line to all women in the province of Ontario who have experienced any form of abuse. Provides crisis counselling, safety planning, emotional support, information and referrals accessible 24/7/365.

**Toll-free: 1-866-863-0511   TTY: 1-866-863-7868**

### **Crisis Resources in the GTA**

The CAMH Distress Crisis Resources web page lists a number of phone lines, response teams and hospitals in the GTA.

<https://www.camh.ca/en/health-info/crisis-resources>

# STUDENT SUPPORTS

## OTHER

### **Student Assistance Plan (Undergraduate)**

Psychological counseling (offered in-person, over the phone, or over secure video) and academic-life services (legal consultation, financial consultation, life coaching, nutrition consultation and wellness resources offered virtually or in-person)

<https://www.msumcmaster.ca/services-directory/36-health-and-dental-insurance/student-assistance-plan>

### **Ombuds Office**

Advice for students, staff, and faculty regarding academic and non-academic concerns.

MUSC 210

**ext. 24151**

[ombuds@mcmaster.ca](mailto:ombuds@mcmaster.ca)

[mcmaster.ca/ombuds](http://mcmaster.ca/ombuds)

### **SWHAT - Walk Safe Program**

The Student Walk Home Attendant Team (SWHAT) is a volunteer service within the McMaster Students Union that will walk or bus with students during the evening hours 7 days a week, in all kinds of weather! (MSU Service)

**Ext. 27500**

[swhat@msu.mcmaster.ca](mailto:swhat@msu.mcmaster.ca)

### **Student Support and Case Management**

Student rights & responsibilities

GH 207

**ext. 23845**

[studentconduct.mcmaster.ca](mailto:studentconduct.mcmaster.ca)

### **Chaplaincy Centre**

Pastoral support with personal counselling and bereavement support groups.

MUSC 231

**ext. 24207**

### **McMaster Engineering Society**

Support from other McMaster Engineering Students

<https://www.macengsociety.ca/>

## **MSU PEER SUPPORT SERVICES**

### **MSU Maccess**

Maccess is a service that aims to build and maintain a campus that celebrates, advocates, and ensures inclusivity in the area of disability. A central aspect to Maccess is the provision of peer support by trained volunteers with lived experiences with disability such as chronic illness, mental illness, mental health concerns, neurodivergence, and additional identities.

### **Student Health Education Centre**

SHEC is a peer-run health promotion, education, and referral service for McMaster University students. SHEC focuses on engaging with students about health-related issues through performances, peer support, fundraisers, and events. The service offers peer support, anonymous and confidential pregnancy testing, a resource library, condoms, lubricant, and menstrual products. SHEC's space is located in MUSC 202.

### **Women + Gender Equity Network**

WGEN is a service that caters to women, transfolk, people who identify outside the gender binary, and all survivors of sexual assault. WGEN provides a safe(r) space and resource library on campus in MUSC 204. Volunteers in the space offer peer support and the service also runs a support group for survivors of domestic and intimate partner violence.

### **Pride Community Centre**

The Pride Community Centre is a service of the McMaster Students Union. We provide a contact point for McMaster students that may identify as gay, lesbian, bisexual, transgender, queer, and/or any of the other diverse identities that make up our community. We offer educational programming and access to resources of interest, as well as peer support and a physical space for students to meet and socialize with each other. As advocates for gender & sexual diversity, the PCC's mandate upholds that LGBTQ+ students are entitled to a safe and supportive campus, absent of homophobia and transphobia, where the expression of one's gender & sexual identity is welcomed and respected.