

# MECH ENG 4B03

## Topics in Product Development – Winter 2025

Instructor: Dr. Elizabeth Hassan

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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
Tues 1230-230 Thu 1230-130	Per Mosaic

### Tutorial : Starting January 14

Section	Time	Room	TAs:
T01	Tue 230	Per Mosaic	Salman Ahmed <a href="mailto:ahmas68@mcmaster.ca">ahmas68@mcmaster.ca</a>
T02	Tue 330	Per Mosaic	Jasmine Kurtz <a href="mailto:kurtzj@mcmaster.ca">kurtzj@mcmaster.ca</a>
T03	Thu 230	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:** 1100-1200 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 MECHENG 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 Sunday April 13, 2025, 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.

	<i>Due</i>	<i>Value</i>
<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	7 Feb	10%
A2 – Testing report	7 Mar	15%
A3 – Financial and manufacturing analysis	28 Mar	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 27 Jan	5%
DR2 – Form and function	In class and tutorial week of 24 Feb	10%
DR3 - Final Pitch, business model	In class and tutorial week of 24 Mar + 31 Mar	10%
Final project report and prototype	Submit pdf on avenue, due Apr 8 (grace period ends 13 Apr)	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 and availability of industry guests.

Week of		Lecture	Lab	Hand In, Due Friday midnight
<b>0</b>	6 Jan	Intro, Concepts	No lab, form teams	
<b>1</b>	13 Jan	User insights, part design	Mini DR1	
<b>2</b>	20 Jan	Part design, Aesthetics	Mini DR2	
<b>3</b>	27 Jan	Design Review 1	Design Review 1	
<b>4</b>	3 Feb	Ergonomics and design for 3d printing	Mini DR3	A1
<b>5</b>	10 Feb	Testing, Business Model	Mini DR4	Individual Prototype parts
<b>Reading Week – Enjoy yourselves</b>				
<b>6</b>	24 Feb	Design Review 2	Design Review 2	
<b>7</b>	3 Mar	Finance	Mini DR5	A2
<b>8</b>	10 Mar	Manufacturing	Mini DR6	
<b>9</b>	17 Mar	Venture capital and Liability	Mini DR7	
<b>10</b>	24 Mar	Design “for”	Mini DR8	A3
<b>11</b>	31 Mar	Design Review 3	Design Review 3	
<b>12</b>	7 Apr	Cancelled due to Capstone day	Cancelled due to Capstone day	Group Final Report
<b>Hand in all work no later than midnight EST Apr 13 2025 *No Extensions*</b>				



## EQUITY, DIVERSITY, AND INCLUSION

Every registered student belongs in this course. Diversity of backgrounds and experiences is expected and welcome. You can expect your Instructor to be respectful of this diversity in all aspects of the course, and the same is expected of you.

The Department of Mechanical Engineering is committed to creating an environment in which students of all genders, cultures, ethnicities, races, sexual orientations, abilities, and socioeconomic backgrounds have equal access to education and are welcomed and treated fairly. If you have any concerns regarding inclusion in our Department, in particular if you or one of your peers is experiencing harassment or discrimination, you are encouraged to contact the Chair, Associate Undergraduate Chair, Academic Advisor or to contact the [Equity and Inclusion Office](#).

## MENTAL HEALTH & WELLNESS

For a list of McMaster University's resources, please refer to the [Student Wellness Centre](#). [Talkspot](#) is a non-crisis mental health resource specifically for students in the Faculty of Engineering.

## 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:

1. plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. improper collaboration in group work.
3. 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

McMaster is committed to an inclusive and respectful community. These principles and expectations extend to online activities including electronic chat groups, video calls and other learning platforms.

**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.

## 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.

## SUBMISSION OF REQUEST FOR RELIEF FOR MISSED ACADEMIC WORK

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".

- 1. Relief for missed academic work worth less than 25% of the final grade resulting from medical or personal situations lasting up to three calendar days:**
  - Use the [McMaster Student Absence Form](#) (MSAF) on-line self-reporting tool. No further documentation is required.
  - Students may submit requests for relief using the MSAF once per term.
  - An automated email will be sent to the course instructor, who will determine the appropriate relief. Students must immediately follow up with their instructors. Failure to do so may negate the opportunity for relief.
  - The MSAF cannot be used to meet a religious obligation or to celebrate an important religious holiday.
  - The MSAF cannot be used for academic work that has already been completed attempted.

- An MSAF applies only to work that is due within the period for which the MSAF applies, i.e. the 3-day period that is specified in the MSAF; however, all work due in that period can be covered by one MSAF.
- The MSAF cannot be used to apply for relief for any final examination or its equivalent. See *Petitions for Special Consideration* above.

2. **For medical or personal situations lasting more than three calendar days, and/or for missed academic work worth 25% or more of the final grade, and/or for any request for relief in a term where the MSAF has been used previously in that term:**

- Students must report to their Faculty Office to discuss their situation and will be required to provide appropriate **supporting documentation**.
- If warranted, the Faculty Office will approve the absence, and the instructor will determine appropriate relief.

#### 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.