ENGINEER 2PX3

Integrated Engineering Design Project 2

Course Outline - Winter Semester, 2021-2022

1. Course Details

Instructional Team:

Dr. Maryam Aramesh, PhD	arameshm@mcmaster.ca
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Dr. John Preston, PhD, P.Eng	prestonj@mcmaster.ca

Instructional Assistant Interns:

Mr. Rongxuan Du	dur6@mcmaster.ca

Support Staff:

Mr. Basem Yassa	yassab@mcmaster.ca

Office Hours: Will be identified after the first week

2. Communication Policy

Need help and have questions related to the course? We want to make sure your questions get answered. To ensure this, it's important that the correct communication method is used.

Got a question during scheduled class hours (e.g., lecture, lab, Design Studio)? The best way to get a prompt response is to raise your hand and ask away! It is likely that others have the same question too and we can't answer a question that is not asked.

Got a question outside scheduled class hours? In this case, email is the best method. Please direct all emails to: prof2px3@mcmaster.ca. This ensures your email gets directed to the most appropriate individual for the fastest response. Every attempt will be made to reply within 24 hours (excluding weekends). Please include a subject prefix of "ENGINEER 2PX3". Emails must be sent from your @mcmaster.ca account. Be sure to include your student number in your email.

3. INCLUSIVE ENVIRONMENT STATEMENT

We consider this classroom to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

We will gladly honour your request to address you by an alternate name or gender pronoun. Please advise us of this preference early in the semester so that we may make appropriate changes to our records.

4. Course Description and Learning Outcomes

This course provides a multi-disciplinary learning environment that develops skills in engineering design and technical communication through a term-long project that addresses an industry or community relevant issue. Through the project, students are also exposed to the technical language used in other disciplines. Students are expected to apply the technical knowledge learned in first year and second year courses in the completion of the project. Upon successful completion of this course, the student should be able to:

- Demonstrate an ability to:
    - Identify stakeholders, and gather and analyze requirements (including determining objectives and constraints) for an engineering design project within a thematic area.
    - Formulate several design prototypes to match the requirements.
    - Objectively identify a design prototype to go forward in the design process.
    - Critique the strengths and/or weaknesses of other group's design proposals.
    - Iterate on your design by incorporating stakeholder feedback.
- Describe the merits of an engineering design using appropriate technical language in oral and written forms.
- Use accurate technical terminology and appropriate communication methods for diverse audiences
- Become familiar with the technical language used in multiple engineering disciplines.
- Reflect in writing on their growth as designers in engineering.

5. Informal Course Description

ENGINEER 2PX3 is a multi-disciplinary experiential learning course, where students receive formal instruction in engineering design and technical communications and complete a term-long design project. Students, in teams of four will work on an engineering design project in the areas of 3D Printed Housing, Clean Water for Remote Communities, McMaster Recycling Plant, or Infrastructure for Self-Driving Vehicles. To achieve a multi-disciplinary experience, the student groups will consist of students from different engineering disciplines. The goal is for students to not only carry out engineering design but also become better designers at the end. Thus, assessment will be based on the project's journey as opposed to simply the project's outcome.

Students will carry out engineering design in their project following what we call the PERSEID process: **Performance + Environmental + Regulatory + Socio-cultural screening for Engineering Integrated Design**. Through this process, students are exposed to a broad, complex, authentic engineering systems and societal stakeholder considerations. Engineering design is carried out following a phased progression of design alternative assessment based on realistic design considerations, including testing and validation through simulation, as well as a balance of scaffolded activities and creative design-space.

Students will also develop critical technical communication skills in ENGINEER 2PX3. It is not only important to produce great engineering designs through PERSEID process, it is equally important to communicate those ideas effectively. Therefore, throughout the project, students will be asked to give individual and group oral presentations. Furthermore, students will have to complete different written tasks such as writing a technical memo, personal reflections, and a technical report.

The course is run through two **50-minute** lectures one **1 hour, 50 minute** in-person design studios, and one **50-minute** asynchronous tutorial, weekly. One of the lectures will focus on technical communications, while the other lecture will focus on engineering design, technical knowledge and practical information related to the projects. The design studios will be instructor-led and support the students in completing their engineering

designs. The design studios will also provide opportunity to deliver/discuss discipline-specific content as required.

Students will be pre-assigned to a specific four-person group. In the first week of classes, through the asynchronous design studios, students groups will complete and submit a project ranking worksheet. Unfortunately, we cannot accommodate requests to change groups, nor assign every group their highest-ranked choice.

The four projects are:

1. 3D Printed Housing Infrastructure Design (Dr. Lee and Dr. Phillion)
2. Clean Water for Remote Communities (Dr. Dickson and Dr. Jeremic)
3. McMaster Recycling Plant Design (Dr. Aramesh and Dr. Leung)
4. Self-Driving Vehicle Infrastructure (Dr. Maccio and Dr. Preston)

6. Course Delivery

The delivery of this course occurs through weekly lectures, asynchronous tutorials, and synchronous design studios, each of which are held weekly. The course consists of four sections: C01, C02, C03, and C04. Please always go to the same lecture time.

LECTURES will be held in BSB 147, twice per week. Lecture 1 focuses on engineering design, technical knowledge, and practical information related to the project. Lecture 2 focuses on technical communications. Refer to your assigned lecture section for the date and time.

ASYNCHRONOUS TUTORIALS represent unscheduled learning time. The activities for the asynchronous tutorials are posted on Avenue 2 Learn, have been carefully crafted to get you thinking about technical engineering knowledge, as well as the performance, environmental, regulatory, and social-cultural constraints that influence the Engineering Design Process prior to the Design Studio. The **Asynchronous tutorials for Week X must be completed before the Design Studio for that same week.**

DESIGN STUDIOS are a dedicated time to collaborate as a team on project activities. Design Studios are held in ETB 124 and 126, using carefully crafted worksheets to help you navigate through the Engineering Design Process as you complete your engineering design project. Instructional staff (i.e., faculty mentors, IAI, and TAs) will be available for support during your scheduled time.

Online Management – Avenue-to-Learn
Avenue-to-Learn will be the online management system. Through Avenue, you will be able to:

- Find all course materials (lecture slides, projects briefs, asynchronous tutorial worksheets and videos, design studio documents, etc.)
- View course-related announcements
- Submit course work (individual assignment, group work) for grading
- View your gradebook

7. Student Deliverables and Assessment

- 5 Individual Assignments:

    - 2 progress presentations made to your group and one other group (5%x2=10%)
    - 2 written self-reflections (5%x2=10%)
    - 1 project-specific engineering technical memo (5%)
    - Design Studio Participation (5%)
- 4 Group Assignments:
    - Milestone #1 (15%)
    - Milestone #2 (15%)
    - Group Presentation (20%)
    - Final Technical Report (20%)
- Peer Evaluations:
    - Peer evaluations will be carried out after M1, M2, and Final Report. The peer evaluations will be used to weigh the marks assigned to an individual group member; however, all mark weighting decisions will be at the discretion of the course co-ordinators. Students who don't complete a fair share of the work may see their grade reduced by up to two McMaster Grade Points.
- There is no Final Exam

8. SUBMISSION OF WORK

SUBMISSION PENALTIES: Please be aware of the following penalties for Design Projects and Individual Activities:

- All written reports and assignments must be uploaded to Avenue by 11:59pm EST on the due date, or they will not be graded.
- Submissions must be in the correct format or will be subject to a mark deduction.
- Presentations must be made on the assigned date; there is no changing of date at the last minute.
- Any Submissions deemed to be partially or fully copied will be considered an academic offence and be subject to terms laid out under the Academic Integrity Policy

GRADING CONCERNS: Grades will be posted to Avenue as soon as possible upon completion. You will have 7 calendar days from the date your grade is posted to address any concerns you may have to instructional team.

- Any questions/concerns must be addressed electronically through an MS Form* that will be made available on Avenue (*An MS Form is like a Google Form, but it's Microsoft and not Google)
- Concerns with regards to grading will not be considered without submitting through the appropriate channels (i.e., the posted MS Form)
- Any concerns or appeals brought to the intention of the instructional team after 7 calendar days from the day the grade was posted to Avenue will not be processed

9. Important Dates

Individual Presentation #1	Once between Week 3 and Week 6. Schedule made in Week 2
Self-Reflection #1	Sunday January 30th 2022 (End of Week 3)
Milestone #1	Sunday, February 6th 2022 (End of Week 4)
Individual Presentation #2	Once between Week 7 and Week 10. Schedule will follow the same as for Indiv Presentation #1
Individual Project-Specific Technical Memo	Sunday, March 20th 2022 (End of Week 9)
Milestone #2	Sunday, March 13th 2022 (End of Week 8)
Self-Reflection #2	Sunday, April 10th, 2022 (End of Week 12)

Final Group Presentations	Week 11 & Week 12 (Schedule made in Week 9)
Final Technical Report	Tuesday, April 12th 2022 (plus two days grace)

Dates are subject to change. Appropriate notice will be provided.

10. Textbooks and Course Materials

No required textbooks. All required course materials will be provided on Avenue to Learn.

11. POLICY 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. submission of work not one's own or which other credit been obtained.
- Improper collaboration in group work.
- Copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

In this course we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. Students will be expected to submit their work electronically either directly to Turnitin.com or via Avenue to Learn (A2L) plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish to submit their work through A2L and/or Turnitin.com must still submit an electronic and/or hardcopy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com or A2L. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). To see the Turnitin.com Policy, please go to www.mcmaster.ca/academicintegrity.

ON-LINE ACCESS

In this course, we will be using **Avenue-to-Learn** and (perhaps) **Microsoft Teams**. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, usernames 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 this course 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 ACCOMMODATIONS FOR 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 to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

ACADEMIC ACCOMMODATION 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"

1. All MSAFs are to be directed to prof2px3@mcmaster.ca. Sending to another email address will delay processing.
2. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.
    - For **individual assignments**, the grade weight of the MSAFed assignment will be distributed amongst the remaining individual assignments.
    - MSAFs related to **group assignments** will be dealt with on a case-by-case basis.

Add a statement from John Preston relating to Group 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 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.

NOTICE REGARDING POSSIBLE COURSE MODIFICATION

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

REFERENCE TO RESEARCH ETHICS

The two principles underlying integrity in research in a university setting are these: a researcher must be honest in proposing, seeking support for, conducting, and reporting research; a researcher must respect the rights of others in these activities. Any departure from these principles will diminish the integrity of the research enterprise. This policy applies to all those conducting research at or under the aegis of McMaster University. It is incumbent upon all members of the university community to practice and to promote ethical behaviour. To see the Policy on Research Ethics at McMaster University, please go to https://reo.mcmaster.ca/.

PEDAGOGICAL STUDY

For the study of engineering education, you may be asked to provide information or feedback about course components. When possible, the instructor will share these results with participants.