

MacChangers – Program Syllabus

Fall 2020 / Winter 2021

Tuesday Evenings – 5:30pm-6:30pm

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MacChangers is a co-curricular program that provides resources, coaching, and support to multidisciplinary teams of students who work with local community members to propose innovative solutions in response to community-defined priorities

In September 2015, Canada along with 192 other UN member states adopted the 2030 Agenda for Sustainable Development. The 2030 Agenda is a 15-year global framework centred on an ambitious set of 17 Sustainable Development Goals (SDGs), 169 targets and over 230 indicators. The agenda envisions a secure world free of poverty and hunger, with full and productive employment, access to quality education and universal health coverage, the achievement of gender equality of opportunity, the empowerment of all females, and an end to environmental degradation. As a MacChanger, students will focus on understanding and proposing a local solution for an SDG under the challenge areas of Clean and Green, Economic Prosperity and Growth, Infrastructure and Built Environment, and Healthy and Safe Cities.

MacChangers runs **virtually** from October to March, at the end of which you should be able to:

1. Apply disciplinary knowledge through a Design Thinking approach to develop a proposed solution to a real-world problem facing the Hamilton community, including:
 - a. Describing the characteristics/specifications of a solution to that problem through the use of mathematical modelling, evidence-based research, policy review, appropriate cultural consideration, and/or financial analysis depending on project context,

- b. Proposing a solution that meets the solution description and meets the needs of the impacted residents through iterations, consultation, and mentorship, and
 - c. Designing a testing procedure that would indicate the successful implementation of your solution.
2. Apply McMaster University's Principles of Community Engagement while working with a diverse set of community members, stakeholders, and team members,
3. Incorporating the principles of equity, inclusivity, and diversity into your problem-solving process, including:
 - a. Collaborating on a team composed of individuals with unique lived experience and disciplinary knowledge, and
 - b. Creating solution ideas that benefit a wide and diverse range of users,
4. Work collaboratively in a team-based work environment, including:
 - a. Committing your interest to a project, and your expertise to your team members,
 - b. Composing constructive team member feedback, and
 - c. Integrating team member feedback about yourself to improve.
5. Effectively communicate information about your problem-solving process in the modern world, including:
 - a. In supporting documentation of your design process,
 - b. Through presentations to your peers, and
 - c. Through a technical showcase to community members and stakeholders.

PROGRAM COMMITMENT

MacChangers has a total time commitment of up to 3 hours per week. In addition, students are expected to commit to:

- Attending regular Workshops and Professional Development Sessions on Microsoft Teams (or another online platform) from 5:30-6:30p.m.
- Meeting virtually once a month with Kyle Ansilio and Abbie Little with your team outside of a workshop.
- Submitting regular project deliverables that meet the standards of the program.
- Managing their own team's work schedule, including research, information sharing, and presentation preparation.
- Communicating regularly with the program staff.

PROGRAM STRUCTURE

MacChangers is intended to be completed by teams of 5 students. Students may enter the program with a formed team; otherwise students will be formed into teams using their application submissions.

Workshops: Approximately every week, there will be virtual workshops on Microsoft Teams (or another online platform) that will assist you in moving your project forward. *At least 2* members of each team must be present for the entire duration of each workshop.

Regular Deliverables: Between workshops, there may be deliverables that must be completed and submitted before the next workshop. The program staff will provide constructive feedback on these deliverables to assist you in your project.

Monthly Meetings: Student teams must meet *at least once per month* with the Program Lead, beginning in October, outside of workshops or work sessions. The purpose of these meetings is to provide updates on the status of your team and your project. Before this monthly meeting, each member of a team must submit a Project Status Report (PSR) no later than 1 hour before the meeting. The PSR format is available on Avenue to Learn.

Presentations: Students will present their work at different times in the program before presenting their project at the MacChangers Showcase at the end of the year. Students will be coached on how to present effectively in a video format and will be given constructive feedback.

Project Brief: This is the final assessment in the program, and compiles all of the work done over eight months into one page. An effective Project Brief is able to answer most of the following questions:

- Problem Identification
 - What is the main problem that you are trying to solve?
 - How can you prove that this problem is worth solving? (i.e. what statistics are relevant to this problem? What research have you conducted?)
 - What are end-users' pains associated with this problem?
 - Can you break the main problem down into smaller problems?
 - What are existing solutions to this problem? What are the limitations of those existing solutions?
- Solution Description and Constraints
 - What are the requirements of a general solution to your problem?
 - Think of a given problem that has multiple solutions. Every solution to that problem contains common requirements that allow them to solve the problem.
 - How would a solution benefit your end-user? (gains)
 - What are real-world constraints that a general solution must operate within? (i.e. municipal laws?)
- Proposed Solution
 - What is your proposed solution?
 - How much will it cost in short-term and long-term? How do you bring in revenue to fund an ongoing solution?

- What are the realistic constraints needed in order to implement this solution? (Change in policy? Change in human behaviour? Change in budget?)
- How are you minimizing unintended consequences in the implementation of your solution? (how might your solution affect those other than the intended beneficiary?)

The Problem Identification and Solution Description are completed over the Fall term, and the Proposed Solution is completed over the Winter term.

SCHEDULE

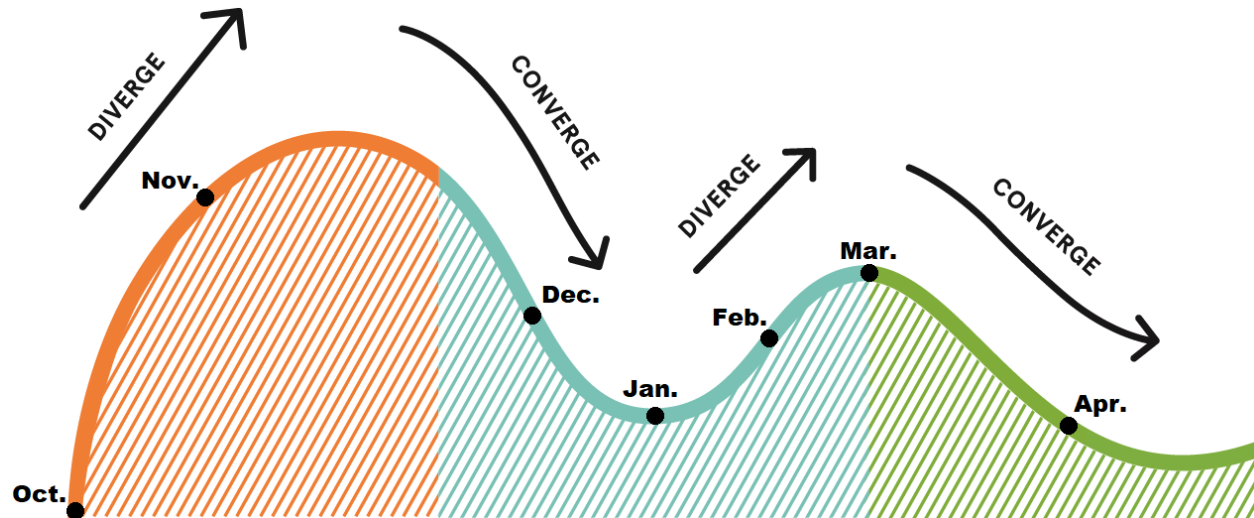
Date	Session	
Tue. Oct. 6	<u>Session 1</u> : Orientation	
Mon. Oct. 13	Mid-Term Recess (no session)	
Tue. Oct. 20	<u>Session 2</u> : Human-Centered Design	
Tue. Oct. 27	<u>Session 3</u> : Community-Based Research	
Tue. Nov. 3	<u>Session 4</u> : Professional Communication	
Tue. Nov. 10	<u>Session 5</u> : Webinar with Community Members	
Tue. Nov. 17	<u>Session 6</u> : Downloading Insights	
Tue. Nov. 24	<u>Session 7</u> : TBD	
Tue. Dec. 1	<u>Session 8</u> : Presentation of Problem Identification + Solution Description	
Tue. Jan. 12	<u>Session 9</u> : Rapid Ideation	
Tue. Jan. 19	<u>Session 10</u> : Equitable and Inclusive Problem-Solving	
Tue. Jan. 26	<u>Session 11</u> : Collaborative Ideation	
Tue. Feb. 2	<u>Session 12</u> : Prototyping and Financial Viability	
Tue. Feb. 9	<u>Session 13</u> : Webinar with Community Members	
Mon. Feb. 15	Mid-Term Recess (no session)	
Tue. Feb. 23	<u>Session 14</u> : TBD	
Tue. Mar. 2	<u>Session 15</u> : TBD	
Tue. Mar. 9	<u>Session 16</u> : Writing a Project Brief	
Tue. Mar. 16	<u>Session 17</u> : TBD	
Tue. Mar. 23	Project Showcase	
Tue. Mar. 30	<u>Session 18*</u> : Framing MacChangers on your portfolio	

*this session is optional

TIMELINE

Below is a high-level timeline of approximately where students should be in a *perfect scenario*. **However**, students should not feel deterred if they feel they are falling behind, as the staff and student partners will work with groups to support them as necessary. When working on complex and ambiguous problems, it is common to encounter issues with scoping and scaling the projects, finding resources, conducting research, and meeting the right people. In some extreme (but occasional!) situations, groups

need to pivot their projects substantially or entirely. **No matter what trouble you are experiencing, please seek assistance from the staff and student partners.**



October: Following registration and orientation, students should have formed their groups, identified a general challenge area, and begun conducting research on those challenges (where are they happening, who are they affecting, are there any attempted solutions, etc.) Groups should attempt to learn as much as they can about these challenges ahead of the Community Partner Interview in November.

November: After learning more about their challenge area, students participate in a webinar with Community Partners that can speak to challenges happening in Hamilton at the level of individuals living with these challenges. While research can provide a very high-level description of these challenges, Community Partners can provide a local perspective at which students are most equipped to work. After these interviews, groups should identify several themes around their challenge that are prevalent in the Hamilton community before narrowing down to a specific and scoped problem.

December: At the beginning of December, groups will submit the first half of their Project Brief and present their Problem Identification and Solution Description (explained above) to the staff. Over exams, the staff and student partners will work to provide feedback on these items to ensure that groups have scaled their projects down to a manageable level. Groups will submit their revised documents before the Winter term begins in January.

January: Once groups have identified their problem, they begin brainstorming ideas of how to solve the problem. Students are encouraged to generate a handful of potential solutions, prototyping often, and investigating why their solution may or may not be feasible. Groups should have at least 2 thoughtful solution ideas before February.

February: In mid-February, groups will participate in another round of Community Partner Interviews. The purpose of these interviews is to discuss the desirability (human-centered) and feasibility (technical-centered) of the projects at a local scale. Students begin refining their solution(s) after these interviews and are then asked to begin considering the viability (financial-centered) of their ideas.

March: Groups should have a solution narrowed down, and the viability/feasibility of those solutions should continue to be explored and cemented. Students also begin preparing for the Project Showcase, submitting their Project Briefs for feedback before the first practice session.

ENGINEER 3CX3A/B

Students may complete the MacChangers program towards the requirements of ENGINEER 3CX3 A/B. The description from the academic calendar follows below:

“This course will provide students an opportunity for formal recognition of experiential learning achieved through a substantial contribution to a non-technical co-curricular activity. This course will allow Engineering students to obtain credit in complementary studies.

One lecture (three hours); term one and two

Prerequisite(s): Registration in Level III or above in the Faculty of Engineering”

ENGINEER 3CX3 offers workshops on skills essential to successful completion of MacChangers, such as team dynamics and leadership. Students do not need to be enrolled in ENGINEER 3CX3 to attend these workshops or to complete MacChangers. Enrollment is not guaranteed, and it is the students’ responsibility to inquire about enrolling in the course should they choose to do so.

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.

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. As an official McMaster Engineering Program, these standards are still applied to participants in the MacChangers Program.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <http://www.mcmaster.ca/academicintegrity>.

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.

NOTICE REGARDING POSSIBLE PROGRAM MODIFICATION

The program lead(s) and university reserve the right to modify elements of the program during the term. The university may change the dates and deadlines for any or all programs 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.

ON-LINE STATEMENT FOR PROGRAM REQUIRING ONLINE ACCESS OR WORK
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The MacChangers program will be using Avenue to Learn. 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 MacChangers will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.