McMaster University

CHEMENG 4W06

Chemical Plant Design and Capstone Project

Fall 2026-Winter 2027

Chemical Engineering Department

Capstone Project Proposal
Call for Submission

The department of Chemical Engineering at McMaster University has developed a final-year capstone project structure that is focused on industry-student collaborations to solve or investigate a problem posed by potential industrial partners. The over-arching goal of this new capstone stream is to provide students opportunities to solve real-world problems while simultaneously providing value to the companies willing to support them. One of our long-time industry collaborators calls this experience as **"The best longest job interview".**

This document is meant to provide some context on potential projects and collaborations, including time commitments, degree/course requirements, and potential project scopes. What follows below is a series of potential questions or concerns that our industry partners may have along with preliminary answers.

We are also delighted to share with you our Capstone Webpage which highlights the projects that our students have been working on during past couple of years.

If you decide to support our students serve as one of industry partners of the course, you can complete and submit this form by **July 31, 2026**, so you are contacted as industry partner of the capstone course for Fall 2026 - Winter 2027. If you have any questions, please do not hesitate to reach out to us.

We look forward to developing meaningful capstone projects for our students and industry partners and I thank you for your time and efforts to make this dream a reality.

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link to the form: ***McMaster Chemical Engineering Capstone - Call for Proposal – Fill out form***

Industry partner involvement and requirements

Each project under the new capstone stream requires an industry partner willing to dedicate time and attention to the proposed student project. This time will likely be voluntary by the industry partner. Commitments of the partner over the course of the project will include:

- Working with the students to define the scope of a primarily engineering design project, including deliverables required by the supporting company.
- Meeting with and guiding students throughout the tenure of the project. Specific time commitments are up to the industry partner, but an estimate is two hours per week of face-to-face or email correspondence, with additional time toward the end of the project.
- Identify and assist with processing any project logistics (NDAs, IP agreement, etc.).
- Evaluate and provide feedback on team's progress reports (5 in total) as well as final report of the project. Guideline will be provided by the course instructor.
- Attending the year-end capstone final presentation session and Mac ENG Capstone Expo Day in April 2026.

Potential industry benefits of participation in this capstone project

There are numerous potential benefits for industry partners participating in the new capstone stream. Such benefits may include (but are not limited to):

- An opportunity to explore an expansive or intriguing project that may not have funding or work-hours otherwise available.
- An opportunity to interact with a keen group of undergraduate students, including the chance to assess work habits, expertise, time management, communication skills, and other skills critical for successful employment.
- A potential collaboration with a professor in a specific subject area, that may also have access to specialized lab equipment that can be used for lab/bench scale work.
- A chance to establish ties with the chemical engineering department at McMaster University and professors with research interests related to potential industry projects.
- The potential to establish long-running capstone project partnerships that will result in value additions to the company in the long run.
- A meaningful value addition to the company through supervising a group of young passionate engineering graduates.

Intellectual Property Rights

We recognize that a meaningful project to many companies will involve use or generation of intellectual property. Working with the McMaster Industry Liaison Office (MILO), background IP is normally secured by Non-Disclosure Agreements. MILO can work with the company's legal team over the summer before the project begins to draft an acceptable agreement and members of the MILO staff will walk students through the agreement before they are asked to sign in the Fall. Project agreements can also be drafted prior to the project starting that outline ownership and licencing rights. If you need to review our standard agreements, please let us know.

Expected Project Team Experience

The experience of each project team will vary and should be discussed prior to the project progressing beyond the proposal stage. It can be guaranteed that each student will be in their final year of undergraduate studies and will

thus have a functional knowledge of mass/heat transfer, stagewise operations, control systems, process design and simulation, reactor design, and fluid mechanics, Optimization, simulation using ASPEN Plus, etc. Students will also gain in-depth experience on engineering economics, including cost estimations and financial projections. They also have laboratory skills (Design and performing experiments and Data analysis) in different fields including transport phenomena, fluid mechanics, reaction kinetics, reactor design and process control.

The course coordinator will monitor the overall progress of projects and deals with any admin work of the project. Each team of students is also supervised by a faculty mentor with enough background in the related field of the project.

Important Note: Project team (including faculty mentor and industry partners) need to ensure the attributes/indicators required by the Canadian Engineering Accreditation Board (CEAB) are measured. The most important aspect of accreditation is DESIGN. All capstone projects should have a design component (either design of a new process or equipment or re-design of an existing process or equipment). This means, **research-based project and projects that are looking at ONLY feasibility studies or simulation are not acceptable as a capstone project.**

Expected Students' Time Commitments

It is anticipated that each student commits to **10-15 hours of work per week** over approximately **7 months** (September to mid April, and considering the break during December). Thus, for a group of 5 students, the project should require approximately:

10-15 hrs/week × 4 weeks/month × 7 months × 5 students/group = **1400 - 2100 work-hours per project.**

Of course, it is anticipated that project scopes may require slightly more or less time than the above estimate on a project-to-project basis, but this serves as a baseline for interested industry partners. Moreover, it should also be clear that the time commitments of each group are not obliged to be 15 hours per week every week. Some weeks will undoubtedly require more time while others (during exams and the holiday season, for example) will likely have lower productivity.

Project Timeline and Deliverables

Project Timeline:

Although projects are very diverse with unique scopes, it is expected that all of them to follow a general timeline:

Term 1, Sep to Dec 2026:

- Team formation and project selection
- Project proposal
- Literature review to fully understand the background of the project
- Review of potential solutions
- Finalization of design selection(s)

Term 2, Jan to Apr 2027:

Deliverables for term 2 can be flexible based on the scopes of the projects. However, most of the capstone projects are expected to have the following deliverables. Details can be discussed with the course coordinator at the beginning of term 2.

- Approval of the final project solution and scope (with industry and course coordinator)
- Final Design, simulations, and optimization (including PFD and/or P&ID)

- Other analysis depending on the project including but not limited to HAZOP, economic evaluations, Environmental assessments, optimization
- Final report and presentations

Project Deliverables

Note that the following deliverables will be required for each project. However, the industry partner may require further documentation or deliverables depending on the project:

- Project proposal that must be approved by the capstone coordinator from McMaster University.
- Project management documents (Gantt chart, Group meeting log/minutes, etc.)
- Progress reports.
- Final project documents including final report.
- Final presentation at capstone showcase including project video.
- Reflections and Peer Evaluations.

Engineering design software available

Chemical Engineering students at McMaster University have access to academic licenses for the following simulation, design and productivity software packages. This is a shortlist of potentially important software.

- Aspen Plus, Aspen Dynamics, Aspen Energy Analyzer, Aspen HYSYS
- MATLAB
- Microsoft Visio
- Pipe-Flo
- AutoCAD, Autodesk Inventor
- Python
- ANSYS
- General Algebraic Model Solver (GAMS): Optimization software
- Bio-Win (can be available if needed)

Note: Other software required for the project can be available to students through educational licences whenever needed.