

Civil Engineering
CIVENG 4CA4
Construction Management and
Automation
Fall 2023



ENGINEERING

Instructor Information

Dr. Saiedeh Razavi
Email: razavi@mcmaster.ca
Office Hours:
Weekdays by Appointment

Course Information

Lectures:

Mondays 11:30 AM - 12:20 PM

Wednesdays 11:30 AM - 12:20 PM

Fridays 11:30 AM - 12:20 PM

Tutorials:

Tuesdays 2:30 PM - 4:20 PM

Course Dates: 09/05/2023 - 12/06/2023

Units: 4.00

Course Delivery Mode: In Person

Course Description: This course covers the fundamental concepts of construction projects and construction management as well as tools and techniques in construction

scheduling, estimating, and project control. The course includes an introduction to a range of computer-aided construction management tools and concepts including Building Information Modeling (BIM), automation and telematics, and advanced technological trends in construction. Three lectures, one tutorial (two hours); one term Prerequisite(s): ENGINEER 3PX3 or IBEHS 4P04 Anti-Requisite(s): CIVENG 3RR3, 4CM4

Instructor-Specific Course Information

- This is an in-person class, and attendance is expected.
- All course-related announcements will be posted on Avenue to Learn's course webpage.
- Unless otherwise specified, all deliverables are due at 8 PM on the course page on Avenue to Learn (A2L).
- No late assignment will be accepted. Students can use their MSAF or contact the Faculty of Engineering's Undergraduate Advisor at the Dean's office to accommodate missed work.
- Marks associated with any MSAF-accommodated missed work will be distributed on everything else in the course.
- This course has a major group project. Groups are self-selecting and self-governing with a firm deadline for group formation (Sep. 15th). Teams are expected to prepare and submit a "Group Contract," for which a sample is provided on A2L. Those not joining any group by the deadline must complete the project individually.
- Term projects' presentations will be randomly scheduled over the last week's lecture and tutorial times.
- Other projects' specific policies will be provided in the project descriptions.
- In-class demonstrations of software tools will be presented. They are intended to provide students with preliminary introductions to the tools and give them a "jump start," not to fully train students on the use of tools. Students will require self-study before they can work effectively with the tools.

Meeting Details

Our goal is to provide an environment that is free of discrimination and harassment, as well as an environment that supports your learning in construction management. If you require a meeting with the instructor outside the classroom, communicate with her using your McMaster e-mail account and/or Avenue to Learn. The e-mail subject line must start with the course number (otherwise, your e-mail may receive a low priority). Meetings can be coordinated to be in-person or online.

Important Links

- [Mosaic](#)
- [Avenue to Learn](#)
- [Student Accessibility Services - Accommodations](#)
- [McMaster University Library](#)
- [eReserves](#)

McMaster University's writing support: <https://studentsuccess.mcmaster.ca/writing-andacademic-skills/appointments/>

Land Acknowledgement: We recognize and acknowledge that students of McMaster University meet and learn on the traditional territories of the Mississauga and Haudenosaunee nations and within the lands protected by the "Dish With One Spoon" wampum, an agreement to peaceably share and care for the resources around the Great Lakes.

Please find more information at the following links:

<https://libguides.mcmaster.ca/welcome-to-mcmaster>

<https://indigiservices.mcmaster.ca>

Course Learning Outcomes

For accreditation reasons, these learning outcome statements must be tied back to CEAB graduate attributes (GAs), including those that are measured in this course. If you are unsure how to do this, please contact the Associate Chair Undergraduate in your department.

- Learning: Through the term projects and the course assignments, students will be able to critically evaluate and apply knowledge, methods and skills procured through self-directed and self-identified sources, including those that lie outside the nominal course curriculum. Students are encouraged to consult with construction practitioners to gain a better understanding and to fulfill the requirements of the projects (CEAB Indicator 12.1).
- Tools: The ability to create, adapt, modify and extend tools and techniques to manage and solve problems, in particular in project and construction management. The students will learn tools and techniques for planning, scheduling, estimating, and project control and will develop the ability to adopt or enhance them to manage projects more efficiently (CEAB Indicator 5.3).
- Investigation: Students will be capable of selecting appropriate construction scheduling models and methods and identifying assumptions and constraints in the resources (CEAB Indicator 3.2). Students will also be able to estimate outcomes and uncertainties in terms of project duration and cost and determine appropriate equipment or data type to collect (CEAB Indicator 3.3).
- Team Work: Through active participation in the course and also term group projects, students will be able to develop and implement processes and methodologies to manage the effectiveness of a team both in terms of the quality of the work produced by the team as well as the interpersonal relationships within the team. This is an important skill that is essential for the success of students in their future careers. (CEAB Indicator 6.2).

Course Learning Goals

- This course aims to introduce students to fundamental concepts in Construction Project Management and the Construction Industry, accompanied by the knowledge of estimating, scheduling, and control of engineering, procurement and construction projects.
- The course also introduces students to innovative technologies, tools, and techniques in modern construction and the opportunities that can help this industry to be safer, more efficient, and more sustainable. Success in achieving the objectives of this course heavily relies on the student's engagement in active learning and self-learning opportunities.

Required Materials and Texts

Textbook Listing: <https://textbooks.mcmaster.ca>

Project Management Institute RSMeans Cost Data Student Edition

Publisher: R. S. Means Company, Incorporated

Publication Date: 2012

<https://ebookcentral.proquest.com/lib/mcmu/reader.action?docID=843674&ppg=3>

Optional Course Materials

Textbook Listing: <https://textbooks.mcmaster.ca>

BIM Handbook : A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers

Authors: Eastman, Ch., Teicholz, P., Sacks, R., Liston, K.

Publisher: Wiley & Sons, Inc.

Publication Date: 2018

Edition: 3rd

<https://ebookcentral.proquest.com/lib/mcmu/detail.action?docID=5447327>

Construction Management, 4th Edition

Authors: Daniel W. Halpin and Bolivar A. Senior.

Publisher: John Wiley & Sons, Inc

Publication Date: 2011

Edition: 4th

Managing the Construction Process: Estimating, Scheduling, and Project Control

Authors: Gould, F. E

Publication Date: 2012

Edition: 4th

Computer-Based Construction Project Management

Authors: Hegazy, T

Publisher: Prentice Hall

Publication Date: 2002

Construction Planning, Equipment, and Methods

Authors: Peurifoy, Robert L., Schexnayder, Cliff J., Schmitt, Robert, Shapira, Aviad

Publisher: McGrawHill

Publication Date: 2018

Edition: 9th

https://mcmaster.primo.exlibrisgroup.com/permalink/01OCUL_MU/deno1h/alma99102867

Class Format

In Person

This is an in-person class, and attendance is expected. Please note:

- Presentations will be available on A2L.
- Lectures will not be recorded.
- You may be required to take notes during class.

Course Evaluation

Assessment of Learning	Weight (%)
Mid-term 1	25%
Mid-term 2	25%
Term Project	30%
Assignments	20%

Grading Scale

Grade	Equivalent Grade Point	Equivalent Percentages
A+	12	90-100
A	11	85-89
A-	10	80-84
B+	9	77-79
B	8	73-76
B-	7	70-72
C+	6	67-69
C	5	63-66
C-	4	60-62
D+	3	57-59
D	2	53-56
D-	1	50-52
F	0	0-49

Course Schedule

Schedule	Topics	Other Details
WEEK 1	Introduction to the Course	First Lecture on Sep. 6th
	New Technologies and Trends in Construction	No Tutorials in Week 1
WEEK 2	Construction Industry & Construction Project	Tutorials start with an

	Management Construction project participants	introduction to the term project and Revit.
	Construction Contracts	Sep. 15: Term project's group selection deadline
WEEK 3	Construction Risks and Delivery Methods	
	Construction Processes and Work Breakdown Structure	
	Autodesk Revit	
WEEK 4	Autodesk Revit (continued)	Sep. 25: Assignment 1 due
WEEK 5	Estimating fundamentals	
	Scheduling fundamentals	Oct. 2: Assignment 2 due
	Project consultation	
WEEK 6 (after the mid-term recess)	Critical Path Method (CPM) & PDM	Oct. 17: Project's part 1 due
	Introduction to MS Project	
WEEK 7	CPM & PDM (continued)	
	Resource-Constrained Scheduling & Recourse Levelling	Oct. 25: Assignment 3 due
	Introduction to MS Project (continued)	
WEEK 8	Mid-term 1	
	Recourse Allocation	Mid-term 1
	Integrated Project Delivery in Navisworks	
WEEK 9	Time Cost Trade-off	
	Repetitive & Linear Projects	Nov. 9: Assignment 4 due
	Integrated Project Delivery in Navisworks (continued)	

WEEK 10	Repetitive & Linear Projects (Continued) Integrated Project Delivery - Navisworks (continued)	Nov. 16: Assignment 5 due
	Project Control and Earned Value Method	
WEEK 11	Mid-term Review Project Consultation	
WEEK 12	Mid-term 2 Guest Lecture	Mid-term 2 Nov. 30: Final project due
WEEK 13	Term Project Presentations	

Late Assignments

No late assignment will be accepted.

Absences, Missed Work, Illness

For accommodation of missed work, students can use their MSAF or contact the Faculty of Engineering's Undergraduate Advisor at the Dean's office.

Marks associated with any MSAF-accommodated missed work will be distributed on everything else in the course.

Turnitin.com

We use a web-based service (Turnitin.com) to reveal the authenticity and ownership of student-submitted project reports. Students will be expected to submit their work electronically via the A2L platform 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.

Course Modification

The instructor reserves the right to change the dates and deadlines for any elements of the course. Changes will be communicated through regular communication channels, such as in-class announcements and notifications on A2L.

Generative AI: Some Use Permitted

Students may use generative AI for editing/translating/outlining/brainstorming/revising their work throughout the course so long as the use of generative AI is referenced and/or acknowledged in their submitted work. Use of generative AI outside the stated use of [editing/translating/outlining/brainstorming/revising/etc.] without citation or acknowledgement will constitute academic dishonesty. It is the student's responsibility to be clear on the limitations for use and to be clear on the expectations for citation and reference, and to do so appropriately.

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-proceduresguidelines/>

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

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. Avenue to Learn, 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.

Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, 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 to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

Academic Advising

For any academic inquiries please reach out to the Office of the Associate Dean (Academic) in Engineering located in JHE-Hatch 301.

Details on academic supports and contact information are available from:

<https://www.eng.mcmaster.ca/programs/academic-advising>

Requests for Relief for Missed Academic Term Work

In the event of an absence for medical or other reasons, students should review and follow the [Policy on 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, Avenue to Learn and/or McMaster email.