

Course Outline

1. COURSE INFORMATION

Session Offered	Winter 2023	
Course Name	Building Science	
Course Code	CIVTECH 4BC3 – SEP 6BC3	
Date(s) and Time(s) of lectures	Wednesdays 6:30 PM – 9:30 PM, ETB 235	
Program Name	Civil Engineering Infrastructure Technology	
Calendar Description		
Instructor(s)	Shahzad Soudian	E-Mail: soudians@mcmaster.ca Office Hours & Location: Tuesdays 2-3 pm (Online)

2. COURSE SPECIFICS

Course Description	Topics include building science theory, heat, air, moisture transfer, design of building enclosure, building energy load, HVAC and renewable energy systems, building sustainability programs and codes, Net Zero buildings.		
Instruction Type	Code	Type	Hours per term
	C	Classroom instruction	24
	L	Laboratory, workshop or fieldwork	10
	T	Tutorial	5
	DE	Distance education	0
	Total Hours		39
Resources	ISBN	Textbook Title & Edition	Author & Publisher
	ISBN: 978-0-9837953-9-1	High-Performance Enclosures: Design Guide for Institutional, Commercial, and Industrial Buildings in Cold Climates	John F. Straube, Building Science Press, 2012
	Other Supplies	Source	
Prerequisite(s)	<i>Registration in Civil Engineering Infrastructure Technology</i>		
Corequisite(s)			
Antirequisite(s)			
Course Specific Policies	<ul style="list-style-type: none"> - Attendance in all the classes is mandatory. The short in-class quizzes at the end of each session will account for attendance. - Individual and group activities are expected in the classroom and for the project. 		
Departmental Policies	<p>Students must maintain a GPA of 3.5/12 to continue in the program.</p> <p>In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of “out-of-class” work for every scheduled hour in class. “Out-of-class” work includes reading, research, assignments and preparation for tests and examinations.</p> <p>Where group work is indicated in the course outline, such collaborative work is mandatory.</p>		

	The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception. Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class. Instructor has the right to submit work to software to identify plagiarism.	
3. SUB TOPIC(S)		
Week 1	Introduction * Course outline * Building Science	January 11 th
Week 2	- Heat transfer – Part 1 - Final project overview	January 18 th
Week 3	- Heat transfer – Part 2 - Airflow in buildings	January 25 th
Week 4	Psychrometrics	February 1 st
Week 5	Moisture transport in buildings	February 8 th
Week 6	Building enclosure design	February 15 th
Mid-Term Recess (Monday, February 20th- Sunday, February 26th)		
Week 8	Comfort and health in buildings - HVAC systems – Part 1	March 1 st
Week 9	- HVAC systems – Part 2 - Assignment 2 presentation in class	March 8 th
Week 10	Energy in buildings * Building energy loads * Renewable energy technologies in buildings (Guest lecturer)	March 15 th
Week 11	-Project Overview -Simulation discussion	March 22 nd
Week 12	Energy efficiency / Sustainable Building Standards *LEED *Passive House *Zero Energy Buildings *Other standards	March 29 th
Week 13	-Renewable energy workshop -Comfort workshop	April 5 th
Week 14	Final group project presentation in class	April 12 th
Classes end: Wednesday, April 12 th , 2023 Final Examination Period: Friday, April 14 th to Saturday, April 29 th All examinations MUST be written during the scheduled examination period.		
Course evaluation		
In-class quizzes	Short quizzes at the end of each session on the topics presented that day .	
Assignment 1	Due on February 15 th	
Assignment 2	Due on March 8 th	
Final project	Due on April 12 th (no extension possible for this date)	
Advanced component	Due on April 5 th	
Final Exam	During exam week (will be announced)	
Note that this structure represents a plan and is subject to adjustment term by term.		

The instructor and the 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.

4. ASSESSMENT OF LEARNING *including dates*	Weight (4BC3)	Weight (6BC3)
In-class quizzes	10%	10%
Assignment 1	15%	10%
Assignment 2	15%	10%
Final project report and presentation	35%	30%
Final Exam	25%	25%
Advanced component (Mandatory for 6BC3 students- Optional for 4BC3 students)	-	15%
TOTAL	100%	100%

Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. Understanding the environmental impacts of the built environment and approaches to mitigate them.
2. Getting familiarized with the behaviour of water vapour in dry air using the psychrometric chart.
3. Building knowledge on the fundamentals of heat, air, moisture flow into buildings, and the balance of indoor environmental comfort, energy use, and building durability.
4. Enclosure control layers and applying the theoretical aspects of heat, air, and moisture transport into enclosure design by selecting appropriate materials and configuration.
5. Developing knowledge on indoor environmental quality in buildings and various building HVAC systems
6. Building an understanding of sustainable building design principles and practices, in addition to approaches to move towards net zero building design.
7. Demonstrating presentation skills and applying course materials to the design project in a group format.

6. COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf

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: 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 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.

COURSES WITH AN ON-LINE ELEMENT

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.

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.

COMMUNICATIONS

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

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.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM 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”.

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. <http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf>

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.