

### COURSE INFORMATION

Course Name: Structural Materials and Design

Course Code: 3P04

Session Offered: Fall Term 2020-2021

Calendar Description: CIVENG 3P04

Instructor(s): Carlos Escalante, P.Eng.

Phone: 905-979-7476

Email: escalace@mcmaster.ca

Office Hours/Contact: Fridays (3-5 PM)

Class Schedule Day(s): Mondays and Thursdays (9:30-10:20 am)

Tuesdays: (10:30-11:20 am)

Tutorial Day(s): Tuesday (8:30-10:20 am)

Wednesday (4:30-6:20 pm)

Location: Virtual

Teaching Assistants:

Moustafa Abdel-Mooty - abdelmom@mcmaster.ca

Mouna Reda - redam1@mcmaster.ca

Feras Alsheet - sheitf1@mcmaster.ca

### 1. COURSE OBJECTIVES

1. Knowledge of most common construction materials, including concrete, structural steel and wood.
2. Understanding their important properties relevant to the design, construction and performance of structures made of these materials, and understanding the key factors that affect the various engineering properties of these materials.
3. Ability to characterize aggregates used in concrete, calculate the proportion a concrete mix for target strength and durability, blend the ingredients and produce the actual mix.
4. Perform the key laboratory tests/analysis of data to assess the strength and some other mechanical and physical properties of the concrete.
5. Analyse systematically the test data, discuss the findings and report the results in a coherent form.
6. Understanding the composition and relevant properties of reinforcing and structural steels as well some other ferrous alloys, and the Canadian CSA standards specifications for meeting specified requirements.
7. Understanding the composition, key properties and advantages and disadvantages of fibre reinforced polymers (FRP) in construction.
8. Understanding the structure, properties and use of wood in construction and its limitations; the factors which influence the mechanical properties and durability of wood.
9. Understanding the structural design process and the concepts of load and resistance
10. Understanding the concepts of uncertainty in design and its effect on the safety and serviceability of structures, with particular focus on the National Building Code of Canada.

### 2. COURSE SPECIFIC POLICIES

**Term Test:** There will be a term test for the course to be conducted during the week of October 19, 2020 – Time TBD [Location: VIRTUAL]. This is an on-line test, and as such, books and notes will be permitted during the term test (as well as during the Final Examination).

Any conflict between the term test and any other courses must be brought to the attention of the instructor immediately, so that alternate arrangements may be made.

Marked term test will be returned to students during lecture period, and left-over books may be picked up during tutorial times only.

**Missed Term Test:** Please see McMaster Undergraduate Calendar for the relevant policy. Accordingly, please contact the associate dean of engineering in order to obtain permission for relief. If such a relief is granted, a makeup test may be arranged. **Such a makeup test will include course materials covered in the lectures up to two days prior to such a makeup test.**

If a makeup test is not arranged, then the marks associated with the missed term test will be re-allocated to the final examination.

### 3. SCHEDULE

WEEK 1	Concrete	
WEEK 2	Concrete	
WEEK 3	Concrete	Assignment 1
WEEK 4	Mechanical Properties of Materials	
WEEK 5	Mechanical Properties of Materials	Assignment 2
WEEK 6	Reading Week	
WEEK 7	Steel	
WEEK 8	Steel	Assignment 3
WEEK 9	Wood	
WEEK 10	Wood	
WEEK 11	Plastics and Composites	Assignment 4
WEEK 12	Concepts of Structural Design	
WEEK 13	Concepts of Structural Design	Assignment 5
FINAL EXAMINATION	Scheduled during the regular University Final Examination period established by the Registrar's Office	

### 4. ASSESSMENT OF LEARNING

### WEIGHT %

Assignments: (5 assignments in total)	25%
Concrete Mix-Design Project:	10%
On-line Participation:	5%
Term Test (week of October 19 <sup>th</sup> ):	20%
Final Examination:	40%

### 5. LEARNING OUTCOMES

- 1.2 Competence in Natural Sciences
- 6.1 Ability to manage time and processes effectively, prioritizing competing demands to achieve personal and team goals and objectives.
- 9.2 Is able to address uncertainties in the prediction of interactions on society and the environment in a structured and transparent manner.
- 9.3 Assess possible options and design configurations from a sustainability engineering perspective, which emphasizes environmental stewardship, life-cycle analysis, and long-term decision-making principles.
- 11.4 Is able to Identify, characterize, assess, and manage risks to project success.

## 6. 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.

### Laboratory Safety

The Faculty of Engineering is committed to McMaster University's Workplace and Environmental Health and Safety Policy which states: "Students are required by University policy to comply with all University health, safety and environmental programs and policies". It is your responsibility to understand McMaster University Workplace and Environmental Health and Safety programs and policies. For information on these programs and policies please refer to McMaster University Environmental and Health Support Services Occupational Safety Risk Management Manual at: <https://hr.mcmaster.ca/app/uploads/2019/07/2019-McMaster-Lab-Manual.pdf>. It is also your responsibility to follow any specific Standard Operating Procedures (SOPs) provided for some of the experiments and the laboratory equipment. McMaster University's workplace health and safety guidance during COVID-19 should always be followed. The details and updates of this guidance can be found at <https://hr.mcmaster.ca/resources/covid19/workplace-health-and-safety-guidance-during-covid-19/>. To ensure laboratory safety this term in accordance with McMaster University policy related to COVID-19, all labs will be held virtually.

A laboratory-specific set of rules may be added to ensure that students fully understand laboratory safety rules that are in place prior to their first session.

The safety requirements for JHE-220 are listed below. Students not abiding by these safety requirements will be given one warning. Second offences will result in the student being asked to vacate the laboratory and receiving a grade of zero for that particular lab.

- Glasses or safety glasses/goggles must be worn in the lab at all times.
- Contact lenses are not to be worn in the lab.
- No short (i.e., above the knee) pants or skirts are permitted in the lab – lab coats must be worn over top of your clothing in these instances.
- Closed-toe shoes must be worn at all times.
- No loose clothing allowed.
- Long hair must be tied back.
- Gloves must be worn when working with hazardous chemicals (as indicated by the laboratory instructor).

## 7. POLICIES

### **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](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>.

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](http://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.

### **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](mailto: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".

The McMaster Student Absence Form is a self-reporting tool for **Undergraduate Students** to report absences that last up to 5 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period. You may submit a maximum of 1 Academic Work Missed requests per term. It is **your** responsibility to follow up with your Instructor immediately regarding the nature of the accommodation. If you are absent more than 5 days or exceed 1 request per term you **must** visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation. This form should be filled out immediately when you are about to return to class after your absence.

### **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.

### **PROTECTION OF PRIVACY ACT (FIPPA)**

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades, and all other personal information at all times. For example, the submission and return of assignments and the posting of grades must be done in a manner that ensures confidentiality – see <http://www.mcmaster.ca/univsec/fippa/fippa.cfm>.

### **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.

[https://www.mcmaster.ca/policy/General/HR/Discrimination\\_and\\_Harassment.pdf](https://www.mcmaster.ca/policy/General/HR/Discrimination_and_Harassment.pdf)

**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.

**8. MCMASTER GRADING SCALE**

<b>Grade</b>	<b>Equivalent Grade Point</b>	<b>Equivalent Percentages</b>
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