

### COURSE INFORMATION

Course Name: Surveying and Measurement for Transportation and Construction  
 Course Code: 2A03  
 Session Offered: Fall Calendar Description: 2020  
 Instructor(s): Hao Yang Phone: 905-523-9140 X 24930  
 Email: haoyang@mcmaster.ca  
 Office Hours/Contact: Mon, 3:30 – 5:30 pm (Through MS Teams)  
 Class Schedule Day(s): 62  
 Time:  
     Class: Mon, Wed, 2:30 – 3:20 pm  
     Labs: Monday, 8:30 – 11:20 am; Tuesday, 2:30 – 5:20 pm; Wednesday, 8:30 – 11:20 am  
     Tutorial: Thursday, 9:30 – 11:30 am; Friday, 2:30 – 4:30 pm  
 Location: Virtual- Through **MS Teams ( join with the code: 33rh3xj )**

### 1. COURSE OBJECTIVES

This course covers the basic principles of surveying, the principles of distances, elevation and angles; basic error theory in measurement and calculations; traverse calculations; and route surveys, including horizontal and vertical curves, earthwork, and GPS surveying. The lectures will cover the theory underlying construction surveying and experimental measurements, with selected concepts illustrated through lab and tutorial sessions

### 2. COURSE SPECIFIC POLICIES

1. Class Meeting: The format of this class will be online. Online lecture videos and interaction sessions will be provided during the scheduled lecture time. The lecture will be used to present theoretical/design background and some illustrative example. Please note that there is not any required textbook. The course notes will contain all necessary information. All lectures and the other courses materials will be uploaded to A2L.
2. Tutorial Sessions: Two sessions are provided each week to demonstrate additional examples, provide assistance with problem solving, and for special presentation.
3. Lab Sessions: All lab sessions will be virtual. Pre-recorded videos will be assigned during the lab sessions. The students are required to watch the videos. Filed data from previous years will be assigned for the students to prepare the lab reports.
4. Attendance/Participation: Attendance for lectures or watching the lecture videos is RECOMMENDED. Please join the online lectures at the scheduled time and attend the full class period. Five quizzes will be assigned 1-2 days after of the lecture sessions. The students are required to review the lectures to complete the quizzes.
5. Grade Disputes: All grades are considered final and unamendable on the date in which the final grades are posted. A student can file an appeal within 10 working days of this date if the instructor has failed to implement a previously announced grade policy, awarded a grade in what has been determined to be an

arbitrary or capricious manner, or violated the University rule or policy. The student should first meet with the instructor to resolve the issue prior to beginning the appeal process.

Suggested textbooks and software

[1] Anderson. J.M., Surveying: Theory and Practice, 7<sup>th</sup> Edition, 1998.

[2] Ghiliani, C.D. and Wolf, P.R., Elementary Surveying: An introduction to Geomatics, Person, 14<sup>th</sup> Edition, 2015.

[3] Kavanagh, B.F., Surveying: Principles and Applications, Prentice-Hall, any edition from 5-10.

[4] AutoCAD 2020, free for students at Autodesk Educational Website:

<https://www.autodesk.com/education/support>.

### 3. SCHEDULE

WEEK 1	Introduction of Surveying	HW#1
WEEK 2	Distance measurement	HW#2
WEEK 3	Leveling	HW#3
WEEK 4	Angles and direction	HW#4
WEEK 5	Combined angle and distance measurement	HW#5
WEEK 6	Total station	
WEEK 7	Traverse Computation	HW#6
WEEK 8	Calculation of areas	HW#7
WEEK 9	Route survey: Horizontal curves	HW#8
WEEK 10	Vertical curves	
WEEK 11	Earthwork	HW#9
WEEK 12	GPS Surveying	HW#10
WEEK 13	Final Review	
FINAL EXAMINATION	Scheduled during the regular University Final Examination period established by the Registrar's Office	

### 4. ASSESSMENT OF LEARNING

### WEIGHT %

Homework	20%
Two Midterm Exams	30%
Lab Practices	10%
Quiz	5%
Final Exam	35%

## 5. LEARNING OUTCOMES

An ability to complete a topographic survey using state-of-the-art equipment and develop a map of the area surveyed using state-of-the-art mapping software

- Linkage to CEAB graduate attribute(s) : 3.3, 5.1 and 5.2

An ability to quantify the error from a field survey, whether a surveying a closed traverse or an elevation survey.

- Linkage to CEAB graduate attribute(s): 3.3 and 5.1

An ability to assess which points are appropriate to survey for well-defined topographic mapping.

- Linkage to CEAB graduate attribute(s): 3.3

## 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.

## 7. POLICIES

### 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 can also be added to ensure that students fully understand laboratory safety rules that are in place prior to their first session.

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.

- No running is allowed
- No one will create a situation that could compromise or jeopardize the safety of themselves or anyone else in the lab Watch for traffic

- Do not touch parked vehicles
- Carry instruments in their case, by the handle
- Do not carry more than you can handle
- Total Stations measure distances by firing a low power infra-red laser into a reflector and back to the instrument. Although the laser is not powerful enough to cause damage, do not fire the laser into anyone's eyes
- Instruments are expensive - be careful
- Obey all instructions given to you by the Teaching Assistant and / or lab technical staff
- The lab is held outside, in all weather conditions- dress accordingly
- The lab will be postponed in the event of lightning.
- For labs being done in the area of the helipad: If a helicopter is landing or taking off from the helipad you must place the instruments and tools on the ground and move directly away from the helipad. No one should be within 100m of the helipad while the helicopter rotors are turning. The down wash from the helicopter can throw debris a long distance. Once the rotors have stopped turning or the helicopter has left the area, you may return to continue the lab.

Failure to comply with safety rules, will result in the individual student being denied access to the lab and given a 'did not complete' grade for the lab session

### **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