

**Western University - Faculty of Engineering  
Department of Civil and Environmental Engineering**

**CEE 3324a – Surveying – Course Outline 2025**

This course provides the student with an introduction to basic aspects of the theory and practice of plane surveying within the context of Civil Engineering. The use of AutoCAD to produce engineering drawings is also emphasized. The general objectives are for the student to become able to:

- Recognize the place and importance of surveying in an engineering context
- Use surveying equipment to perform basic measurements of elevations, distances and angles
- Identify sources of error in measurements, apply appropriate corrections and evaluate the influence of error on subsequent calculations
- Use measured data to calculate design parameters
- Use AutoCAD to produce effective engineering drawings

**Calendar Copy:**

The fundamental theory and procedures of plane surveying with application to engineering construction. Introduction to the use of AutoCAD to produce civil engineering drawings.

**Prerequisites:**

Enrolled in Civil Engineering

**Corequisites:**

none

**Note:** It is the **student's responsibility** to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the **student's responsibility** to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

**Extra Information:**

26 lecture hours, 52 lab/fieldwork hours over two weeks. This course runs in the summer for a period of 10 days (usually the two weeks preceding the start of the fall term). Limited enrolment. Preference will be given to students who have completed term 4 of the Civil Engineering program. Due to the concise nature of the course, students must attend the first class in order to be enrolled, and the last date for dropping the course is at the end of classes on the fourth day.

**Contact Hours:**

9:00am – 6:00pm for 10 days from August 18 – 29. Consult the attached course schedule for further details.

Attendance at **all** fieldwork sessions is **mandatory**. Lecture material will be posted to the course OWL site. Students are expected to review relevant lecture material prior to attending fieldwork exercises.

**Instructor:**

Dr. Jon Southen, Ph.D, P.Eng.  
SEB 3116, [jsouthen@uwo.ca](mailto:jsouthen@uwo.ca)

**Textbook:**

Course notes will be made available through the course website (<http://westernu.brightspace.com>).

**Other References:**

*Surveying*, J.C. McCormac, Wiley, 2015, 6<sup>th</sup> Edition.  
<https://www.vitalsource.com/referral?term=9781118324226> (optional)

*AutoCAD 2016 and AutoCAD LT 2016 Essentials: Autodesk Official Press*, S. Onstott, Sybex, 2015  
<https://www.vitalsource.com/referral?term=9781119059202> (optional)

*Elemental surveying: an introduction to geomatics*, C.D. Ghilani and P.R. Wolf, Pearson, 14<sup>th</sup> Edition, 2015.

**Laboratory:**

This course comprises both surveying field work and AutoCAD assignments, which will be carried out as indicated on the attached (tentative) schedule. Dates and times are subject to change due to weather conditions.

**Computing:**

Students will use AutoCAD to prepare drawings during tutorial sessions. All students should install AutoCAD software on their personal computers prior to the start of the course. The latest version of AutoCAD is available (free) from: <https://www.autodesk.com/education/free-software/autocad>. AutoCAD is also available in all Engineering computer labs.

**Units:**

Both SI and US units will be used in lectures and examinations

**Specific Learning Objectives:**

Where applicable, students will learn to make field notes in a “standard format”.

The field work and laboratory assignments will prepare students to do the following [GA Indicator]:

1. Run a level loop to third order accuracy using an automatic level. [I1, ET1, ET2]
2. Chain the distances of a closed traverse to an accuracy of 1 in 3000. [I1, ET1, ET2]
3. Measure the internal angles of a closed traverse using a digital theodolite. [I1, ET1, ET2]
4. Use data from 2. and 3. above to perform a mathematical closure on the measured loop traverse. [I1, I3]
5. Tie topographical details into the closed traverse. [I1, I2, ET1, ET2]
6. Present the above information on a topographic plan. [CS2]
7. From a given benchmark and base line determine the coordinates and elevation of a nearby point. [I1, I3, ET1, ET2]
8. Calculate data for horizontal and vertical curves. [PA1]
9. Given two (or three) control stations and their coordinates and appropriate design data for a section of highway, layout the curves and set grades based on the calculations done in 8. [I1, I2, ET1, ET2]
10. Produce topographic plans in AutoCAD. [CS2]
11. Create plan, profile, and cross section drawings in AutoCAD. [CS2]
12. Develop teamwork and group management skills. [ITW1, ITW2, ITW3]
13. Recognize the importance of surveying within the civil engineering context. [KB4, LL1]

### **General Learning Objectives:**

E=Evaluate, T=Teach, I=Introduce; (I) = Introduction, (D) = Developing, (A) = Advanced level

Knowledge Base	I (D)	Engineering Tools	E (D)	Impact on Society	
Problem Analysis	I (D)	Team Work	E (D)	Ethics and Equity	
Investigation	E (A)	Communication	T (D)	Economics and Project Management	
Design		Professionalism		Life-Long Learning	I (D)

### **Course breakdown:**

Engineering Science = 100%

### **Evaluation:**

The final mark will be determined as follows:

AutoCAD assignments	25%
Field work assignments	50%
Final Examination	<u>25%</u>
Total	100%

**Note:** (a) **Students must obtain an average of 50% on each of the above components to pass the course.** If a student fails any component, the student will be assigned the aggregate mark as determined above or 48%, whichever is less.

(b) **Students must turn in all field and AutoCAD assignments and achieve a passing grade in the assignment component, to pass this course.** Students who do not satisfy this requirement will be assigned 48% or the aggregate mark, whichever is less.

(c) **Students who have failed this course previously must repeat all components of the course.** No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted.

### **Examinations:**

A three-hour, open book FINAL EXAMINATION will be held following the completion of class, tentatively scheduled for **Tuesday, September 2 from 1:00 pm to 4:00 pm.**

### **Assignments:**

Assignments will be due as indicated on the posted class schedule. Note that weather or field conditions may necessitate a change in due date, which will be communicated by the instructor through the course OWL site. All assignments will be submitted in electronic format to the course OWL site.

### **Attendance:**

Any student who, in the opinion of the instructor, is absent too frequently from class, laboratory, or tutorial periods will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

**Conduct:**

Students are expected to arrive at lectures and fieldwork sessions on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others. On the premises of the University or at a University-sponsored program, students must abide by the Student Code of Conduct: <http://www.uwo.ca/univsec/board/code.pdf>

**Notice:**

Students are responsible for regularly checking their email and notices posted outside the Civil and Environmental Engineering Department Office

**Consultation:**

Students are encouraged to discuss problems with their teaching assistant and/or instructor in tutorial sessions. Office hours will be arranged for the students to see the instructor and teaching assistants. Other individual consultation can be arranged by appointment with the appropriate instructor.

**Use of English:**

In accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

**Missed/Late Accommodation Policy:**

Students missing a test/assignment/lab or examination you will report the absence by submitting Academic Consideration Request form through STUDENT ABSENCE PORTAL. Documentation must be provided as soon as possible.

**Exam Accommodation:**

If you are unable to write a final examination, report your absence using the Academic Consideration Request Form through STUDENT ABSENCE PORTAL. Be prepared to provide the Undergraduate Services Office with supporting documentation (see next page for information on documentation) the next day, or as soon as possible (in cases where students are hospitalized). The following circumstances are not considered grounds for missing a final examination or requesting special examinations: common cold, headache, sleeping in, misreading timetable and travel arrangements. In order to receive permission to write a Special Examination, you must obtain the approval of the Chair of the Department and the Associate Dean and in order to apply you must submit an the Academic Consideration Request Form through STUDENT ABSENCE PORTAL. PLEASE NOTE: It is the student's responsibility to check the date, time and location of the Special Examination.

**Late Assignments:**

Advise the instructor if you are having problems completing the assignment on time (prior to the due date of the assignment). Be prepared to submit the Academic Consideration Request Form and provide documentation if requested by the instructor. If you are granted an extension, establish a due date. Note: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

**Medical Accommodation:**

Requests for academic consideration must include the following components:

- Self-attestation signed by the student (This is only accepted for the first/one absence)
- Medical note
- Indication of the course(s) and assessment(s) affected by the request
- Supporting documentation as relevant

Requests without supporting documentation are limited to one per term per course. Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment. Once the request and supporting documents have been received and reviewed, appropriate academic consideration, if granted, shall be determined by the instructor in consultation with the academic advisor, in a manner consistent with the course outline. Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, or re-weighting of course requirements. Some forms of academic consideration, such as arranging Special Examinations, assigning a grade of Incomplete, or granting late withdrawals without academic penalty, may only be granted by the Academic Advising office of the Faculty of Registration. An instructor may deny academic consideration for any assessment that is not required in the calculation of the final grade (e.g., “8 of 10 quizzes”). Assessment flexibility must be indicated on the course outline. An instructor may deny academic consideration relating to the timeframe submission of work where there is already flexibility in the submission timeframe (e.g., 72-hour submission window). This assessment flexibility must be indicated on the course outline.

**Religious Accommodation:**

When scheduling unavoidably conflicts with religious holidays, which (a) require an absence from the University or (b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), no student will be penalized for absence because of religious reasons, and alternative means will be sought for satisfying the academic requirements involved. If a suitable arrangement cannot be worked out between the student and instructor involved, they should consult the appropriate Department Chair and, if necessary, the student's Dean. It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

**Academic Integrity:**

In the Faculty of Engineering, we encourage students to create a culture of honesty, trust, fairness, respect, responsibility, and courage, befitting the professional degree you are pursuing. Please visit Academic Integrity Western Engineering for more information

**Academic Offences:**

Plagiarism means using another's work without giving credit. The university has rules against plagiarism and other scholastic offences. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is zero on the course work and a repeat offence will earn you zero on the course. A third offence may lead to expulsion from the university.

[Scholastic Discipline for Undergraduate Students & Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know](#)

Students must write their reports, essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

All required papers may be subject to submission for textual similarity review to commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents on the reference database for the purpose of detecting plagiarism of papers

subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between the University of Western Ontario and Turnitin.com (<http://www.turnitin.com>). Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

### **Faculty of Engineering AI Policy:**

The use of generative Artificial intelligence (GenAI) tools won't be discouraged in the Faculty of Engineering. As we pride ourselves on building the future we can't hide from the use of GenAI tools to contribute to the understanding of the course materials. However, the use of GenAI tools in any assignment or contribution during the course will have to be disclosed, as a resource. GenAI tools use won't be permitted in any type of examination or other assessments where the faculty have prohibited their use. If use of GenAI tools is detected by the instructor in these instances, academic offences penalties might be imposed against the student.

### **Use of English Policy:**

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally, poorly written work except for the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

### **Accessibility:**

Western is committed to achieving barrier free accessibility for persons with disabilities studying, visiting and working at Western. As part of this commitment, there are a variety of services, groups and committees on campus devoted to promoting accessibility and to ensuring that individuals have equitable access to services and facilities. To help provide the best experience to all members of the campus community, please visit the Accessibility Western University for information on accessibility-related resources available at Western.

Students with disabilities may arrange for academic accommodation at Western. For a more detailed explanation, please visit Academic Support & Engagement -Academic Accommodation.

### **Inclusivity, Diversity, and Respect:**

The Faculty of Engineering at Western University is committed to creating equitable and inclusive learning environments that value diverse perspectives and experiences. We recognize that university courses often marginalize students based on social identity characteristics such as, but not limited to, Indigeneity, race, ethnicity, nationality, ability, gender identity, gender expression, sexuality, age, language, religion, and socioeconomic status. Understanding this, we strive to facilitate equitable experiences and inclusion within the classroom by respecting and integrating multiple ways of knowing, being, and doing. Please visit the Office of Equity, Diversity and Inclusion.

## **Health and Well-Being:**

- [Health & Wellness Services – Students](#) - Offers appointment-based medical clinic for all registered part-time and full-time students.
- [Mental Health Support](#) - Provides professional and confidential services, free of charge, to students needing assistance to meet their personal, social and academic goals. Services include consultation, referral, groups and workshops, as well as brief, change-oriented psychotherapy.
- [Crisis Support](#) - For immediate assistance, please visit Thames Hall Room 2170 or call 519-661-3030. The crisis clinic operates between 11:00 am - 4:30 pm. For after-hours crisis support, click [here](#).
- [Gender-Based Violence and Survivor Support](#) - “Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts at the following website: [https://www.uwo.ca/health/student\\_support/survivor\\_support/gethelp.html](https://www.uwo.ca/health/student_support/survivor_support/gethelp.html) To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca).

## **Important Contacts**

<a href="#">Engineering Undergraduate Services</a>	SEB 2097	519-661-2130	<a href="mailto:engugrad@uwo.ca">engugrad@uwo.ca</a>
PROGRAM Engineering	SEB 3XXX	519-661-2139	<a href="mailto:ENGPROGRAM@uwo.ca">ENGPROGRAM@uwo.ca</a>
<a href="#">Office of the Registrar/Student Central</a>	WSSB 1120	519-661-2100	

## **Important Links**

- [WESTERN ACADEMIC CALENDAR](#)
- [ACADEMIC RIGHTS AND RESPONSIBILITIES](#)
- [ENGINEERING PROGRESSION REQUIREMENTS AND ACADEMIC REGULATIONS](#)
- [UNIVERSITY STUDENTS' COUNCIL \(USC\) - SERVICES](#)
- [IMPORTANT DATES AND DEADLINES](#)
- [ACADEMIC CONSIDERATION FOR MEDICAL ILLNESS - UNDERGRADUATE STUDENTS](#)
- [ACCOMMODATIONS FOR RELIGIOUS HOLIDAYS](#)
- [SCHEDULING OF ASSIGNMENTS, TESTS, AND EXAMINATIONS](#)
- [STUDENT FORMS](#)
- [OFFICE OF THE REGISTRAR](#)
- [RETENTION OF ELECTRONIC VERSION OF COURSE OUTLINES \(SYLLABI\)](#)
- [ACADEMIC APPEALS](#)
- [STUDENT ABSENCE PORTAL](#)