

CEE 4441 – Civil Engineering Design Project – Course Outline 2024/25

This course is the capstone design for the undergraduate program in the Department. The general objectives are for students to apply the knowledge and skills gained in other Undergraduate courses to the design of a real-world Civil Engineering project. Designs will incorporate technical analyses, as well as assessments of the social, economic, environmental and health and safety aspects of the project. Effective communication of the design outcome through written reports, engineering drawings and oral presentations are an integral component of the project.

Calendar Copy:

Students undertake a comprehensive engineering design project which involves the creative, interactive process of designing a structure/system to meet a specific need subject to economic, health, safety, and environmental constraints. Each group of students is required to write an engineering report and deliver a public lecture.

Prerequisites:

Completion of third year of the Civil Engineering Program

Antirequisites:

CBE 4497, ECE 4416, MME 4499, SE 4450, ES 4499

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.

Contact Hours:

1 lecture hour/week; 4 laboratory hours/week; meetings with advisors. Lectures will be generally be held in-person at the designated location and time found in the academic timetable. Zoom may be used for guest speakers. If required, a link for Zoom meetings will be provided on the course OWL site. Notification of scheduled lectures will be given in advance - students are expected to attend all lectures. The assigned laboratory time will be spent: attending any special lectures (announced in advance), working on the project, meeting with advisors, making presentations, and carrying out activities related to the design.

Course Coordinator:

Dr. Jon Southen, P.Eng., SEB 3116

jsouthen@uwo.ca

Office hours: by appointment

Textbooks and References:

No textbook is required. Pertinent design codes and other resources will be made available through the course OWL site, when possible. Students will be responsible for identifying and obtaining any other reference material necessary to successfully complete the project. Students are encouraged to contact staff at Taylor Library for any questions regarding literature and references.

Computing:

Students are required to use personal computers running a Windows environment and other computing facilities available in the Civil Engineering Design Room (SEB 16) and the Faculty of Engineering Computing Laboratories. SEB 16 can be booked through the Civil & Environmental Engineering Department office (SEB 3005). Students should not remove any materials from the room and should keep it in a clean and tidy condition.

Site Visit:

A site visit may be arranged during the laboratory time early in the course. Transportation will not be provided; students will need to make their own way to the project site of interest should they choose to attend. City of London engineers will be present during the site visit to provide background information about the projects. Details regarding the site visits and how to sign up will be provided on the course OWL site.

Units:

SI units are expected to be used in design submissions.

Specific Learning Objectives:

- Analyze and interpret data and information provided by others to determine project-specific design criteria and parameters. [PA2, D1]
- Perform an open-ended analysis of a civil engineering structure or system and make recommendations based on engineering principles and judgment including comparison of options. [D1, D2, D3, D4, PR1, EPM1, EPM2]
- Gain experience functioning on multi-disciplinary teams that may include participating consulting engineers, architects and landscape architects. [ITW1, ITW2, ITW3]
- Understand professional and ethical responsibility through the refinement of the design to address the public needs. [IESE1]
- Develop the ability to carry out literature searches to find information necessary for completing the project. [D1, LL1, LL2]
- Develop an ability to use the techniques, skills and modern engineering tools necessary for engineering practice. [ET1, ET2, LL1, LL2]
- Improve communication skills by: [CS2, CS3]
 - Meeting regularly with external and internal advisors.
 - Documenting design decisions in clear and concise calculations and notes.
 - Planning and preparing drawings, specifications, and a final report, including cost estimate, that completely describes the proposed design.
 - Presenting and defending the final design before peers and the general public.
 - Keeping records of time spent on various aspects of the project.
 - Allotting the distribution of grades to the individual members of the design team.

General Learning Objectives:

(I – Introduce, T – Teach, E – Evaluate) All at the advanced level.

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

Accreditation Units:

Engineering Design: 100%

Course Deadlines and Evaluation:

The due dates and mark breakdown are as listed below. All dates subject to change if necessary:

	Date	Mark
INDIVIDUAL WORK:		
Logbook	14 Mar 2025	5%
Preliminary Calculations (as part of the Draft Final Design Portfolio)	06 Dec 2024	15%
		20%
GROUP WORK:		
Preliminary Proposal	20 Sep 2024	0%
Final Proposal	11 Oct 2024	5%
Draft of Final Design Portfolio (Design Brief and Drawings) (Note: By 1 January 2025, 30% of course marks are awarded)	06 Dec 2024	10%
Oral Presentation & Defence of Draft Portfolio	17 Jan 2025	5%
Review of Another Group's Draft Portfolio (Written Critique)	23 Jan 2025	5%
Oral Presentation at CEE Design Day	15 Feb 2025	5%
Project Presentation at City of London Competition	7 Mar 2025	0%
		30%
FINAL SUBMISSION:		
Final Design Portfolio:	14 Mar 2025 (see note 6)	
Covering Letter & Final Design Brief		10%
Calculations		20%
Drawings		15%
Display Poster		5%
		50%*
TOTAL:		100%

Notes:

1. Students who do not participate sufficiently in regular team meetings with their Advisors shall not pass the course. Due warning will be given prior to the application of any academic penalty. Such students will receive a grade of 48%.
2. Students who do not achieve a passing grade on each of the three course components (individual work, group work, and final submission) shall not pass the course. They shall be assigned a mark of 48% or the aggregate mark whichever is less.
3. Criteria for the various submissions are described later in this document.
4. The penalty for late submission shall be 10% per day; thus, if any submission is more than 5 days late it cannot receive a passing grade.
5. The mark for the final group submission (the maximum indicated thus "**") shall be multiplied by the number of group members and the product allocated to the members in proportion to each member's contribution to the work. At the end of the course, group members must individually recommend in writing, with stated reasons, a suitable allocation to be used. A summary of the work done by each member with reference to the final report must be attached. If no such recommendations are provided, an equal distribution of marks will be used.

6. The deadline for final submission is ONE WEEK after the City of London Design Competition. The date of the City of London Design Competition is tentatively scheduled for 7 March 2025. Any change to the date will be announced before the end of January, 2025.

Criteria and Evaluation of Course Submissions

1. Logbook (one hardcopy or electronic submission per student)

Each student shall keep a bound logbook (or electronic equivalent) containing (at a minimum) the following sections:

- a) Details of meetings - date, time, duration, those present, main topics, action items.
 - b) Details of CEE 4441 lectures (including the lecture on literature and information search) attended - date, time, speaker, topic, notes.
 - c) Details of work on the Design Project - date, duration, and *aspects of work done personally*.
- The logbook will be submitted at the same time as the final design portfolio in March.

2. Preliminary Proposal (one electronic submission per team)

The preliminary proposal should be made by electronic submission to the course OWL site and shall include:

- a) Group name.
- b) Names of Group Members. Note that design groups are restricted to a minimum of four and a maximum of five group members.
- c) Name and e-mail of Group Leader, who will be responsible for regular reporting to the Faculty Advisor and Faculty Coordinators.
- d) Ranked preference of topic for the design project, including proposed structure scheme if applicable (e.g. 1st choice: Victoria St. Bridge (steel box girder); 2nd choice: Hyde Park Rd. Roundabout; 3rd choice: Coves ESA Pedestrian Bridge (cable stayed)). While all efforts will be made to ensure that teams receive their first choice of project, **the course coordinator reserves the right for the final assignment design team membership and the assignment of the topic of the design project.**

3. Final Proposal (one electronic submission per team)

The final design proposal shall indicate:

- a) Description of the project
- b) Work done by each group member to date.
- c) Identification of outstanding tasks (work still to be done including drawings and specifications).
- d) Assignment of outstanding tasks to group members.
- e) Proposed mechanism for coordination of the activities of each group member.
- f) Schedule for remaining work.

The evaluation of the final design proposal shall be based on content, layout, completeness, and the use of English. The marking rubric will be posted on Owl.

4. Preliminary Calculations and Draft of Final Design Portfolio (project approximately 80% complete) (one electronic submission per team)

A draft of Sections 6.1, 6.2 and 6.3 of the final design portfolio (see point 6., below) must be submitted on the date specified in the Course Deadlines section. For this submission, neatly drawn hand sketches can replace CAD drawings, though CAD drawings are preferred. One copy shall be directly given to the student reviewing team. One electronic copy in pdf format shall be uploaded through OWL. All three sections shall be combined into a single pdf file, including clear scans of any written calculations. This portfolio will be provided to the Faculty Advisor of the team for marking, and to the two Faculty Advisors who will be evaluating the presentation and oral defense of the team in January.

Between the draft submission and oral defense in January, the assigned student reviewing group and faculty advisors will formally review the draft of each final design portfolio. At the defense, the student review group and the faculty advisors will have the opportunity to ask questions. Students are expected to improve their Portfolio between the oral defence and final submission based on feedback from student and faculty reviewers.

5. Review of Draft Final Design Portfolio by Others (Written Critique) (one electronic copy to be submitted)

Each group shall prepare a written critique of the Draft Portfolio assigned to them for review. This critique shall be submitted after the oral defense of the Project. The critique should be in the form of a written report summarizing the reviewing group's professional evaluation of the submitted draft design portfolio. The focus should be on providing benefit to the client by identifying deficiencies in the original design and recommendations for improvement. **The critique should be submitted both to Owl and directly to the team being reviewed.** The marking rubric will be posted on Owl.

6. Final Design Portfolio

The final design portfolio consists of the cover letter, final design brief, calculations, drawings and display poster as described in detail below.

6.1 Final Design Brief

The length of the final design brief shall not exceed 12 typed pages (font size 12, single-spaced). Suggested contents are: Executive Summary; Introduction, Design Criteria, Particulars of Design and Analysis, Cost Estimate, and Recommendations (or Conclusions). The Design Criteria would include the design standards and technical references used; the particular design criteria adopted also must be indicated succinctly. The particulars of design/analysis would summarize the rationale behind the various design decisions. The evaluation of the final design brief shall be based on the format, layout, completeness, technical content and use of English.

6.2 Calculations

Calculations must be well organized, clear, complete, and done on calculation paper. Each calculation page shall be dated, and shall indicate the names or initials of the persons who performed and checked the calculations. A final calculation set, which must be current, checked and indexed, shall be submitted with the final design brief. Students are expected to submit checked calculations to their advisors as the design progresses, so that errors of a fundamental nature will be caught and corrected. The evaluation of calculations will be based on their clarity, completeness, technical content, originality, and accuracy.

6.3 Drawings

The portfolio shall include a full set of drawings which fully describe the design. Each student is required to prepare at least one original drawing. Each drawing shall be dated, and shall indicate the name or initials of the person who did the drawing and the person who checked the drawing. The evaluation of drawings will be based on their technical content, clarity, completeness, and quality of drafting.

6.4 Display Poster

Each student group is required to create a display poster that provides a clear and concise overview of their design solutions to the specific project. An electronic copy should be submitted to Owl. The size of the poster should be no larger than 900 mm × 600 mm. A hardcopy of the poster may be required; if so, student teams are responsible for any costs associated with printing – the Department will not reimburse groups for any costs incurred in producing the required submissions.

One electronic copy of the complete final design portfolio, including ALL of the above individual components, must be submitted.

7. Teamwork Survey
Each student will be required to complete one or more teamwork assessment survey(s) using the ITP Metrics platform. Details will be provided.
8. Design Experience Survey
Each student is required to complete a design experience survey to reflect on the knowledge and skills gained during the course of the project. **The survey will be made available online after the submission of the final design portfolio.**
9. Oral Presentation at CEE Design Day
Presentations are scheduled for Friday, February 15, 2025. Each team will give a presentation of their design to a panel of industry professionals. Presentation is mandatory for all teams.
10. City of London Design Competition
The City of London Design Competition is tentatively scheduled for March 7, 2025. Presentation at the City of London Competition will be open to select teams based on their design performance to date. More details will be provided on the course OWL site.

I. Missed/Late Accommodation Policy:

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

II. Exam Accommodation:

1. If you are unable to write a final examination, report your absence using the Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).
2. 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.
3. 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.

III. Late Assignments:

1. Students must advise the course instructor if they are having difficulty completing an assignment on time (prior to the due date of the assignment).
2. Students should be prepared to submit the Academic Consideration Request Form and provide documentation if requested to do so by the course instructor (see reverse side for information on documentation).
3. If granted an extension, a revised due date should be established with the course instructor. The approval of the Chair of your Department (or the Assistant Dean, First Year Studies, if you are in first year) is not required if assignments will be completed prior to the last day of classes.

4. As the deliverables for this course are primarily team-based, suitable academic considerations will be determined by the instructor in consultation with the affected student and their team.
5. Extensions beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean, Undergraduate Studies. Documentation is mandatory.

Note: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

IV. Medical Accommodation:

1. Requests for Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).
2. Requests for academic consideration must include the following components:
 - a. Self-attestation signed by the student (*This is only accepted for the first/one absence*)
 - b. Medical note
 - c. Indication of the course(s) and assessment(s) affected by the request
 - d. Supporting documentation as relevant
3. Requests without supporting documentation are limited to one per term per course.
4. **Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment.**
5. 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. Suitable academic consideration will be determined by the course instructor in consultation with the affected student and their design team. 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 Engineering.

V. 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.

VI. 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

VII. 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

VIII. 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.

IX. 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.

X. 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](#).

XI. 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](#).

XII. 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](#) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced gender-based or sexual violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts, [here](#). To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Important Contacts:

Engineering Undergraduate Services	SEB 2097	519-661-2130	engugrad@uwo.ca
Civil & Environmental Engineering	SEB 3005	519-661-2139	civil@uwo.ca
Office of the Registrar/Student Central	WSSB 1120	519-661-2100	

Important Links:

- [WESTERN ACADEMIC CALENDAR](#)
- [ACADEMIC RIGHTS AND RESPONSIBILITIES](#)