Western Engineering

John M. Thompson Centre for Engineering Leadership and Innovation

IE 2298 – Integrated Systems Engineering and Design

Course Outline Fall 2025-Winter 2026

Instructor:

LECTURES:	Wednesdays 11:30 am – 1:30 pm Fridays 10:30 am – 12:30 pm Locations listed on course site (western.brightspace.com)
ANTIREQUISITE(s):	MME 2259A/B, the former Integrated Engineering 2297A/B
PREREQUISITE(s):	Registration in Integrated Engineering
CEAB Academic Units:	Engineering Design = 75%, Engineering Science = 25%
Course Resources / References	Select chapters (excerpts provided) from: Ertas, A. (2018). *Transdisciplinary Engineering Design Process* (1st ed.). Wiley. National Aeronautics and Space Administration (2016). *NASA Systems Engineering Handbook*. Available at [https://www.nasa.gov/wp-content/uploads/2018/09/nasa_systems_engineering_handbook_0.pdf] Other articles and readings as assigned, available through Western Libraries. Including: Eckert, C. M., Wynn, D. C., Maier, J. F., Albers, A., Bursac, N., Xin Chen, H. L., Clarkson, P. J., Gericke, K., Gladysz, B., & Shapiro, D. (2017). On the integration of product and process models in engineering design. *Design Science*, 3, Article e3. https://doi.org/10.1017/dsj.2017.2 Iwanaga, T., Wang, H.-H., Hamilton, S. H., Grimm, V., Koralewski, T. E., Salado, A., Elsawah, S., Razavi, S., Yang, J., Glynn, P., Badham, J., Voinov, A., Chen, M., Grant, W. E., Peterson, T. R., Frank, K., Shenk, G., Barton, C. M., Jakeman, A. J., & Little, J. C. (2021). Socio-technical scales in socio-environmental modeling: Managing a system-of-systems modeling approach. *Environmental Modelling & Software : With Environment Data News*, 135, Article 104885. https://doi.org/10.1016/j.envsoft.2020.104885 Vermaas, P., Kroes, P., Poel, I. van de, Franssen, M., & Houkes, W. (2011). *A Philosophy of Technology : From Technical Artefacts to Sociotechnical Systems* (1st ed.). Springer International Publishing. https://doi.org/10.1007/978-3-031-79971-6 Lombard, M. (2019). *Mastering SolidWorks* (1st edition). Sybex. Licensed software: through Western Engineering. Other training resources as assigned.
DESCRIPTION (50 words max) Introduction to classical systems engineering and associated methods, tools and practices, with application experienced through team-based, interdisciplinary design projects. Students will	

gain knowledge across topics that include the Systems Engineering V-model, human-centered design, modeling and optimization, Design for X, sustainability, risk management and human decision making.

General Learning Objectives (CEAB Graduate Attributes)

Knowledge Base	I	Engineering Tools	I	Impact on Society	I
Problem Analysis	I	Individual & Teamwork	D	Ethics and Equity	
Investigation		Communication	D	Economics and Project Mgmt.	I
Design	D	Professionalism		Life-Long Learning	D

Rating: I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before. D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e.g. no review).

	Course Learning Outcomes	**(CAEB) Graduate Attribute**
1	Explain and evaluate different design process frameworks appropriate to specific types of systems and engineering disciplines (KB)	KB4
2	Apply a socio-technical systems view to define the stakeholder context, design problem, and criteria (Des., PA)	PA1 D1
3	Gain practice in transforming requirements across design stages, and in validating requirements (Des.)	D1-D4
4	Apply sustainable design approaches to generate a diverse set of candidate engineering design solutions (Des., IESE)	D2 IESE2
5	Analyze the social-economic-environmental impact of design approaches and system models to inform selection of best solution options for further development (IESE; Des.)	D3 IESE1
6	Bring a design project through all stages to completion, developing and improving requirements and system models in the process. (Des.)	D4
7	Practice learning independently and with academic literature, assessing knowledge limitations, to improve knowledge integration and enhance design solution robustness (LL, CS)	CS1 LL1, LL2
8	Gain familiarity with the tools and techniques used in systems engineering to integrate models of system components and processes (Tools)	ET3
9	Self-assess and improve one's own professional behaviour and contribution to team goals, and provide constructive feedback to others (ITW)	ITW1
10	Demonstrate improved judgment and management of human psychology on one's own behaviour in design process and project management, especially in collaborative idea generation, iterative design, and change management (Des., Ethics)	EPM4
11	Create system maps, concise written reflections, and effective presentation visuals (inc. models) for peer learning and project deliverables (Comm.)	CS3
12	Gain practice in verbal presentation in various settings (peer teaching, formal presentation)	CS2

Assessment

Category	% Worth (of 6.0 credits)	Due in Week # (minor adjustments only when necessary)	Course Learning Outcomes (CLO)
Design Project - Group Assessments*	35	Weekly starting in week 9	All
Design Project - Individual Assessments*	20	Weeks 12, 18, 24	6, 7, 9, 10
Quizzes & Assignments*	25	Weeks 2, 5, 8, 14, 16, 20	1, 2, 3, 4, 5, 7, 8
Attendance, Participation & Professionalism*	10	Throughout	9, 10
Topical Presentations	10	Weeks 3, 7	1, 2, 3, 7, 10, 11, 12
Total	100		

***These categories are Essential Assessments (respectively) for receiving course credit. See Essential Assessments policy below.**

EXTRA COURSE INFORMATION

1. All group grades are tentative. Instructors reserve the right to adjust individual marks on group assessments based on (a) team documentation, and (b) collective observations of student contributions to group assignments and participation in class.

2. Instructors reserve the right to adjust course content, due dates and/or delivery if required to meet Faculty, program and course academic objectives or to respond to unanticipated events.

3. IE 2298 requires regular and consistent engagement and attendance in all scheduled instructional sessions unless otherwise indicated. Any student who fails to attend 80% of a course component or, in the opinion of the instructor(s), is absent too frequently from instructional sessions shall be removed from their project team and be required to meet with the instructor(s). The meeting will review the reasons for the student's absences, determine appropriate consequences and establish any conditions that must be satisfied for the student to return to active participation in the team elements of the course.

4. LATE PENALTIES. All late submissions except quizzes and presentations will be penalized per below:
    a. Up to 1 hr late after due date: 10% penalty
    b. Up to 24 hrs late after due date: 20% Penalty
    c. Beyond 24 hrs late after due date: Submissions will not be accepted; score of 0 will be assigned

5. Presentations must be given on the assigned dates and times, and quizzes must be completed on the assigned dates and times. Any academic consideration requests for these synchronous assessments must be accompanied by documentation submitted to the UGSO (with Academic Consideration Request Form, see policy 1 below). If approved, the student must contact the instructor(s) to initiate alternate arrangements. If not approved, a score of 0 will be assigned. Undocumented absences will not be approved for presentations and quizzes.

6. Academic consideration requests for group submissions will not be accepted, except in the rare case that every member of the group requires academic consideration for the same submission. Students in each group are expected to work together and have appropriate contingency plans in the event that teammates are unable to complete their specific portion(s) of the submission by the due date.

7. ESSENTIAL ASSESSMENTS - REQUIRED FOR COURSE CREDIT. A student will not earn the course credit for IE 2298 without a passing grade (after any necessary adjustments) in each of the following Essential Assessment categories, based on the combined/weighted average of all assessments in each respective category. Failure to satisfy these essential course assessments will result in students receiving a final grade that does NOT exceed 48%. For approved accommodation circumstances, see the Standard Western Engineering Policies below.
    a. Essential Assessment Categories:
        i. Design Project (Group Assessments)
        ii. Design Project (Individual Assessments)
        iii. Quizzes & Assignments
        iv. Attendance, Participation & Professionalism

8. Regrade requests will only be accepted during a 7-day period following the first 24-hours after marks are released (i.e. days 2 through 8 after marks are released). Use the first 24 hours after grades are released to make sure you understand the feedback you were given before asking for a regrade. Regrade requests must specify evidence from your submission that meet the expectations outlined in the rubric. If there was a clerical error in grading (e.g. points were added incorrectly; one question was left ungraded), that will be corrected. However, if it is a regrade request to review the evidence from your work against one or more evaluation criteria, the entire submission may be reviewed for regrading (i.e. regrading can result in the total marks increasing or decreasing).

9. AI Policy: The use of generative Artificial intelligence (GenAI) tools won't be discouraged. However, the use of GenAI tools in any assessment or contribution during the course must be disclosed and documented as a resource. GenAI tools have strengths and weaknesses depending on the purpose of use and the context of application. Students are expected to critically evaluate and determine when GenAI tools are or are not appropriate, and clearly document how they were used if relevant. GenAI tools use are not permitted in any type of assessment where the instructor has 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.

Standard Western Engineering Policies

The Faculty of Engineering has established for 2025 a set of Policies and Procedures for Undergraduate Students. The policy covers:

- Absence/Late Accommodation Policy
- Religious Accommodation
- Academic Integrity
- Academic Offences
- Faculty of Engineering AI Policy
- Accessibility
- Inclusivity, Diversity, and Respect
- Health and Well-being

I. Academic Considerations: For circumstances with short-term impact on student performance

1. There may be situations (e.g. medical, religious, participation in an approved competition) that have **short-term** impact on your course participation and assessments (e.g. absence, late assignment). For such cases, Academic Consideration Requests may be submitted. At Western Engineering, Academic Consideration policies and procedures are found on the corresponding UGSO website, also summarized or explained below. Academic Consideration Requests are submitted through STUDENT ABSENCE PORTAL.

2. Only the requests for valid reasons and meeting any documentation/submission requirements will be considered for approval. The following circumstances are **not** considered grounds for Academic Considerations: travel arrangements, common cold, headache, sleeping in, or misreading the timetable.

3. **Upon approval, alternate arrangements** can be made by the instructor in order to help you fulfill the requirements of the Course with reasonable provisions. If you are granted an extension for an assignment, a new due date will be established. The approval of the Chair of your Department is only required if assignments will be submitted following the last day of classes.

    a. 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.

    b. 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.

    c. It is the student's responsibility to check the date, time and location of the Special Examination.

4. Check the **requirements for documentation** for each relevant assessment. Documentation must be included with the form by default.

a. Be prepared to provide the Undergraduate Services Office (UGSO) with supporting documentation **at the latest within 48 hours from the missed assessment**, or as soon as possible (in cases where students are hospitalized).

b. Forged documentation will have grievous consequences on your academic records and **Good Standing** status with the Faculty of Engineering. Falling short of Good Standing will have negative consequences (e.g. make you ineligible for Co-Op).

5. **One** request **without** documentation is available for each course, once per term, on an assessment that is **NOT** designated "**essential**" for the Course. In other words, undocumented absences cannot be used for the "designated assessment" in each course.

    a. Undocumented absences cannot be used for examinations scheduled by the Office of the Registrar during official examination periods (including take-home final exams and December mid-year exams for full courses) and practical laboratory and performance tests typically scheduled in the last week of the term.

6. For assessments that have **built-in flexibility**, Academic Consideration Requests may be denied. An instructor may also 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. When flexibility in assessment exists and is clearly stated on the course outline, both undocumented absences and academic consideration requests with documentation may be denied.

7. For more information, consult Western University's Policy on Academic Consideration – Undergraduate Students in First Entry Programs (https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf)

8. For circumstances that have a **longer**-term impact on your performance, consult with your Academic Advisor and Accessible Education for **accommodations** (Accessible Education - Academic Support & Engagement - Western University).

II. Accessible Education and Accommodations: for circumstances with long-term impact on student performance

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.

III. Accommodation/Academic Consideration for Medical or Religious Reasons: refer to the Engineering Undergraduate Policies Framework (https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/policies.html)

IV. 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. "Students who are in emotional/mental distress should refer to Mental Health @Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

- 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.

V. Academic Integrity, Academic Offences and Plagiarism

1. It is important that you are familiar with the standards and policies regarding academic integrity and academic offences. refer to the Engineering Undergraduate Policies Framework (https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/policies.html) and Western University policies here: Scholastic Discipline for Undergraduate Students & Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know. 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 Academic Handbook: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

    a. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is a zero grade on the course work and a repeat offence will earn you a zero grade on the course. A third offence may lead to expulsion from the university.

    b. The instructor will forward all suspected cases of academic offences to the UGSO and the home department of the student(s) in question. Academic penalty decisions are made by the Associate Dean, Undergraduate.

2. On group assignments, each person named as a co-author must have directly contributed (e.g. initial writing, significant revisions, original figures) to the submitted document. Activities such as participating in some discussions, or sharing resources or notes that do not contribute to the

submitted work, do NOT merit sharing the team grade. Claiming academic credit for a group assignment that one did not earn co-authorship, is considered academic dishonesty.

3. Students must write and create their own reports, essays, assignment and presentation materials. When you use an idea or a passage (whether paraphrased or directly quoted) or material (including figures) from another author (or previous works by you in or outside the course), you must properly reference them (APA or IEEE format) both in-text (some may be footnotes) and in the references list. Claiming academic credit for works created by another author, or for your works that already received academic credit elsewhere in or outside the course, is considered plagiarism.

    a. For images used from external sources, there may be different types of referencing required (e.g. stock images, original photographs, published artwork, screenshots) – Please consult your instructor. Also see the AI policy section below.

    b. The written assignments capture complex analyses and synthesis work that you perform, which are supported and communicated by your writing skills for clarity, logical organization, effective argumentation, and choice of emphasis. It is unacceptable for largely AI-generated materials to serve as evidence of student competencies being assessed. There may be appropriate uses of the available tools, while some uses would be highly discouraged or prohibited – see the AI policy section above.

    c. All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in 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 Western University and Turnitin.com (http://www.turnitin.com).

4. Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

5. As mentioned in the sections above, forging documentation for Academic Considerations will also be considered an academic offence. Review the relevant sections above.

VI. Use of Electronic Devices

Students may use laptops, tablet computers, or smart phones (vibrate mode only) during class for course related activities. The instructor will periodically indicate that students should “close laptops” to provide their full attention to the learning activities and/or student presentations.

VII. Recording

1. The course intellectual content belongs to the instructors and/or the Faculty of Engineering. Participants in this course are not permitted to record sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor. Students are not allowed to disclose any recordings or their content to anyone not participating in the course without written authorization from the instructor.
2. Recordings made with the instructor’s permission are strictly limited for use in study for this course and may not be shared without express permission.
3. For any recording of course activities taken by course instructors, students will be notified and will only be

used to improve course delivery, instructional content or feedback to students. This may include, but is not limited to, a) videos of student presentations for presentation skills feedback, b) pictures of project displays or deliverables for instructional feedback, and c) pictures or videos of Lecture activities for illustrating future instructional material. Images of students (i.e. photos or videos) will not be recorded without prior consent.

4. Photos and videos may be taken at major course events to promote public engagement at future events, in promoting Western Engineering programs, and to improve instructional materials for future course iterations. Students wishing to discuss the collection and use of recordings during course activities should contact the course coordinator.

VIII. Internet and Electronic Mail

Students are responsible for regularly checking their Western e-mail and the course web site in OWL to make themselves aware of any information that is posted about the course.

When sending an inquiry to faculty or staff, students should include their student number, relevant course number, a concise description of the situation that explains their request for assistance. Use professional writing style, properly addressing the recipient and a courteous tone.

Please note your designated Academic Advisor and home department's contacts below.

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.

Important Contacts

Engineering Undergraduate Services (Academic Advisor for Integrated Engineering: Diana Ali)	SEB 2097	519-661-2130	engugrad@uwo.ca
Office of the Registrar/Student Central	WSSB 1120	519-661-2100	
John M. Thompson Centre for Engineering Leadership and Innovation (Associate Director of Integrated Engineering: Minha R. Ha)	ACEB 2410	519-661-2111 ext. 86725	tceli@uwo.ca

Important Links

- Western Academic Calendar
- Academic Rights and Responsibilities
- Engineering Progression Requirements and Academic Regulations
- University Students' Council (USC) - Services
- Important Dates and Deadlines
- Student Online Forms

- Office of the Registrar
- Select University Policies:
    - Academic Consideration for Medical Illness - Undergraduate Students
    - Accommodations for Religious Holidays
    - Scheduling of Assignments, Tests, and Examinations
    - Academic Appeals