Faculty of Engineering
John M. Thompson Centre for Engineering Leadership and Innovation

ELI 4100A/9400 – Engineering Leadership

COURSE OUTLINE Fall 2023

DESCRIPTION

This course is for students who have an interest in leadership, primarily in an engineering context. We will examine the personal attributes that impact leadership style, with a particular focus on aspects of character. We will address practical leadership issues in the intersection of engineering practice, the organizational context, and the technology-business-society relationship. Our overall objective in the course is to provide a framework for understanding how the student may adapt and utilize their own personal attributes to become a more effective leader in their life and in their future career.

INSTRUCTOR CONTACT INFORMATION

Course instructor: Minha R. Ha
Email address: mha4@uwo.ca
Office: ACEB 2410B
Office hours: By appointment

Prerequisites: Completion of year 2 Engineering or enrollment in year 2 Software Engineering.

CEAB Accreditation Units: Complementary Studies (Elective Course) = 100% or 36 AUs

REQUIRED READINGS

- Selected chapters or articles from available library resources, including:
  - Andrews, Gordon C., Shaw, Patricia & McPhee, John. *Canadian Professional Engineering and Geoscience: Practice and ethics,* 6th ed. Nelson Education, 2019.
  - Calabresi, Guido. *Ideals, Beliefs, Attitudes and the Law.* Syracuse University Press, 1985.
  - Colcleugh, David. *Everyone a Leader: A guide to leading high-performance organizations for engineers and scientists.* University of Toronto Press, 2013.
  - Van de Poel, Ibo & Goldberg, David. *Philosophy and Engineering – An emerging agenda.* Springer, 2010.

- Other required readings will be posted on OWL and discussed in class.

OPTIONAL COURSE READINGS

Any optional readings will be posted on OWL and discussed in class.

Course Learning Objectives

At the end of this course, students will be able to...

1. Engineering Leadership
    1. provide a working definition of leadership in and through engineering, highlighting the unique aspects of engineering discipline, practice and profession
    2. develop and assess vision for change in engineering-organization-society contexts and their interconnectedness

2. Understanding Self & Others
    1. identify the influence of, and ways to work well with, diversity in personality traits as they bear upon communication, conflict management and performance
    2. determine action strategies to enhance one's leadership capability that fit with one's own personality

3. Leader Character
    1. describe how leader character impacts leadership style and decision making approaches during crisis situations and in driving change
    2. identify strategies to strengthen integrity in leadership by developing the 10 aspects of character (Ivey character model)

4. Organizational Culture & Change
    1. describe the relationship and the distinctions between supervision, management, leadership, and organizational culture
    2. select and adapt leadership approach or strategies appropriate to particular situations, including a change initiative, performance management, conflict resolution
    3. recognize the visible and hidden aspects of organizational culture and how they are impacted by leadership behaviour

General Learning Objectives (CEAB Graduate Attributes):

Knowledge Base		Use of Engineering Tools		Impact on Society and the Environment	2/3
Problem Analysis		Individual and Team Work	2/3	Ethics and Equity	3/3
Investigation		Communication Skills	3/3	Economics and Project Management	
Design		Professionalism	2/3	Life-Long Learning	2/3

Notation: x/y, where x is the cognitive level (1: Remember, 2: Understand, 3: Apply) at which the attribute is assessed and y is the academic level (1: Beginner, 2: Intermediate, 3: Advanced) at which the attribute is assessed.

Graduate Student-Specific Learning Outcomes

Degree Level Expectation	Approximate Weight	Assessment Tools	Outcomes
Depth & Breadth of Knowledge	25%	• Mini-Quizzes • Reading Presentation • Inquiry Project • Take-Home Exam	• Identify leadership in engineering context, and describe the differences between leadership and management. • Understand aspects of social psychology relevant to engineering leadership
Research & Scholarship	20%	• Inquiry Project • Take-Home Exam	• Able to analyze and characterize leadership practices used in an engineering context
Level of Application of Knowledge	20%	• Forum Posts • Inquiry Project	• Apply knowledge of leading and motivating to a real-world situation example • Identify and explain leadership challenges in organizations and develop appropriate solutions
Professional Capacity / Autonomy	5%	• Forum Posts (with associated in-class activities) • Presentations	• Understand ethical principles applicable to engineering practice. • Identify, analyze, interpret, and generate potential solutions to issues that arise in organizations with regards to ethical and professional practices
Level of Communication Skills	20%	• Participation in class discussion and exercises • Forum Posts • Presentations	• Demonstrate effective verbal communication in class and case discussions • Demonstrate effective verbal and visual communication in group project, with oral presentation component, analyzing practical leadership problem • Demonstrate effective written communication in individual written assignments
Awareness of Limits of Knowledge	10%	• Inquiry Project • Reading Presentation	• Understand and explain limitations of human decision-making in engineering practice, e.g., due to biases • Understand and explain challenges associated with cultural and individual behaviours that limit generalizability of best practices.

TOPICS

(Instructor reserves the right to adjust the details based on class progress/needs)

Class #	Description
1	Defining Engineering Leadership Challenges at the Micro, Meso, Macro Levels
2	Integrative Worldview and Implications for Personhood Personality Test Results Discussion
3	Epistemological and Moral Tensions within Organizations Building Trust: Leader Character + Negotiating Knowledge and Values
4	Persisting Philosophical and Cultural Challenges in Engineering Science vs. Technology vs. Engineering Practice
5	Case or Reading Presentations
6	Sociotechnical Systems and Impact Evaluation History of Technology Development Technology and Culture, Ethics of Emerging Technologies
7	Inquiry Topic Formulation and Problem Definition
8	Team-Specific Forum & Pitch
9	No Live Class – Consult the Instructor for Feedback
10	Respond to Feedback and Complete Mini-Inquiry
11	Final Presentations A Discussion on Individual Final Report
12	Final Presentations B Peer Recognition

ASSESSMENTS

Assessment Type	Material Covered	Tentative Due Date	Weight
Class Contributions (individual)	Includes forum posts, peer feedback, etc.	Throughout	10%
Reading Presentations (group)	Choice out of selection, first-come-first-serve	During Lesson 5	10%
Quizzes and Reflections (individual)	Lessons 1-4, 6		25% (5 X 5%)
Final Inquiry Presentation (group)	Choice of relevant engineering leadership cases or topics	During Lesson 11 or 12	20%
Final Reflection (individual)	All		5%
Take-Home Exam (individual)	All	Within 2 Weeks after Final Presentations	30%
Total			100%

Activities in which collaboration is permitted:

- Case/Reading presentations – students are expected to work in small teams or individually to analyze cases/readings and to provide verbal synopses in class
- Class discussion and exercises – students are expected to contribute to class discussion, including commenting on contributions of other students, and to participate in small group exercises in class.
- Group inquiry project – students are expected to work in pre-assigned teams to analyze a leadership scenario and to make a joint in-class presentation

Activities in which students must work alone (collaboration is not permitted):

- Mini-quizzes at the end of selected classes
- Individual written submissions, including the Forum Posts and Take-Home Exam

***Minimum Requirement:** In addition to earning grades in the course deliverables, a mark of 50% or more must be achieved on the Written Final Project Paper (in lieu of final exam) in order to receive a passing grade.

Assessments in This Course

Class Contributions: Discussion is an integral aspect of full participation in this course. As we will be using the case method of teaching, students are expected to prepare (e.g. by reading the cases ahead of class) and to appropriately contribute in class. The grade weighting of this element of evaluation reflects this importance to the course. The evaluation rubric for contribution will be discussed in class.

Written Reflections: There will be reflection and discussion questions announced, to which you will contribute a thoughtfully written response. You can draw from your own experiences, external resources, and other courses as they bear upon your reflection, analysis, and synthesis of thought. You can start new threads or build on your peer's post on an existing thread.

Reflections are not to be a summary of what took place but rather consist of key insights and implications for the student as a person/leader. These can include key take-aways from each class and intended actions for self-development. Some of the prompts will concern one's own personal transformation, others may involve feedback on the course:

Final Inquiry Project Presentation: This course employs a term project that will have semi-structured tasks and guidelines. Normally the Professor will suggest a number of topics to be investigated, and to work towards offering practical insights and tools that can be employed in the students' current or future work scenarios. Students can also propose topics and seek the Professor's approval before starting the project.

The evaluation of this project will consist of a written group project plan, a group presentation that will take place during class and an individual written report. Each student will normally receive the same grade for the group Project Plan and Project Presentation. The Written Paper is to be submitted individually and will be graded individually. The report should be 3200-4000 words.

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Course Policies

Grading

Student's work and class contributions are evaluated on what would reasonably be expected of a 4th year Undergraduate student according to the Ontario Qualifications Framework: http://www.tcu.gov.on.ca/pepg/programs/oqf/certificate11.html. University-wide grade descriptors for Undergraduate students are provided in Western's Academic Calendar.

Late Submission Policy: Late submissions will receive a 5% deduction (of the assignment grade) per day and will not be accepted beyond 5 days late. Presentations must be given on the assigned date.

- The late penalty is kept small enough to allow some trade-off as you manage competing responsibilities, while being fair to students who submit their work on time.
- For major interruptions due to unforeseen circumstances, see the Accessibility and Accommodations section below.
- For obtaining co-author credit in group submissions, including presentations, see the Academic Integrity section below.

Communications

Expectations: Course-specific inquiries will be reviewed mainly during the two scheduled time slots during the week (to be discussed in class). Discussion posts, emails, and questions collected during class will be organized to merge similar questions together. Answers will be commonly shared with the class on the Owl site (Q&A page). In order to maximize clarity and efficiency in communication, the major class announcements will be posted on average once per week (set schedule to be discussed in class). Any personal arrangements or discussions will be handled separately.

Student Responsibilities: Every student is responsible to check and review the announcements and course website content carefully, and regularly. Important communications and course management will be hosted on the Owl site. Missed assignment components due to insufficient review of instructions or information will result in lost marks.

Copyright

Use of Course Texts / Copyrighted Resources: All the course materials (including your purchased course pack and distributed materials) are for personal learning use only. They are not to be distributed without the written consent of the original authors. Ensure proper citation when referring to these materials in your assignments.

Recording of Learning Sessions: Some of the in-class activities in this course may be recorded in order to capture the students' contributions. The data captured during these recordings may include the artefacts produced by you, your image and/or voice recordings. Such recordings will

be used for educational purposes related to this course only, not distributed elsewhere and deleted once its use is complete. The purposes may include evaluation of your participation, and/or a summary of insights. Please contact the instructor if you have any concerns related to session recordings.
Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Academic Integrity

Author Credit for Original Work Submitted: Any work that was submitted for a grade in one course cannot be used to obtain a grade in any other course. All work submitted for a grade (and thus towards course credit) must be original work. If you refer to your own work submitted anywhere outside this course, you may cite with proper referencing methods.

Shared Grade for Group Work Submitted: All submitted **group work** will include the **names** of those who actually contributed significantly to that specific deliverable. Each co-author (i.e. project team member) must have developed a significant portion of the content in the submitted work. (Handling administration or formatting alone will not suffice.) As is best practice, the co-authors must be listed in the order of the contribution level (i.e. first author has written the most amount of content for the specific submission).
If you contribute to writing and developing a portion of the presentation content, but are not present to deliver the presentation, you will share the grade for the content only. When there are multiple deliverables in a group project, you will share the credit only on the deliverables where you legitimately claim co-authorship.

Near the end of the course, each student will have the opportunity to submit an individual group evaluation. This will inform the Professor if the students believe that differential grades should be assigned to group members. The student is expected to justify this with specific reasons. The Professor may or may not change the grade on the basis of these submissions. An important factor in this decision will be whether the group requested assistance in how to improve its function during the term and at least attempted to act on this advice and whether the team members showed leadership behaviour in their dealings with each other in this context. Students are expected to demonstrate their leadership learning in their approach to the group elements of this assignment.

Plagiarism: You are expected to consult other people's work in order to obtain information, critical evaluate them, and develop meaningful insights or rationale for your inquiry. The sources must be cited both in text (e.g. on a PPT slide or in a document, at the appropriate paragraph location) and at the end of a submission (i.e. References) Either APA or IEEE referencing method will be accepted in this course.
In order to avoid claiming credit for someone else's intellectual property, especially to avoid simply copying someone's writing, you are advised to summarize (first level processing of information), analyze within and between sources (second level processing), then create your own tables to present useful information. This can help your analyses and conclusions be written in your own words and style, using paraphrasing and direct quotes only when necessary. You will still cite the sources that informed your analyses, with proper referencing techniques.

University policy states that plagiarism, defined as the "act or an instance of **copying or stealing** another's words or ideas and attributing them as one's own," (excerpted from Black's Law Dictionary, West Group, 1999, 7th ed., p. 1170) is a **scholastic offence**. In submitting any written work as part of the coursework requirements students must ensure that this work is written in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations.
Cheating: Students must have a clear understanding of the course activities in which they are expected to work alone (and what working alone implies) and the activities in which they can collaborate or seek help; ask instructor for clarification if needed. Any unauthorized forms of help-seeking or collaboration will be considered an academic offense. University policy states that cheating is an academic offence. If you are caught cheating (e.g. on a test), or participating in cheating (e.g. providing answers to a question), there will be no second warning.

Copied Material Between Students: Students are advised *not* to share copies of their original assignments before they are graded. When peer help is requested, discussions can be held regarding the assignment instructions and feedback can be sought on the inquirer's own developing work. Whether on quizzes or on assignments, providing the material (that has been copied) can make you a participant in academic offence.

Procedures Regarding Academic Offences: 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).

Any student who is suspected of a scholastic offence in respect of any work submitted as part of the coursework requirements will be dealt with according to the University policies. For the purposes of this course, the University official for handling the case will be the Director, Centre of Engineering Leadership and Innovation. All academic offences will be recorded and reported. A common penalty for a first-time offence is a grade of zero in the relevant assignment. A serious incident or repeated offences (at any time at Western, even if first time in this course) may result in suspension or expulsion from the University.

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. 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

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Absences or Interruptions

There may be expected and/or unexpected interruptions to your coursework and participation. Failure to make alternative arrangements - before an expected interruption or within a reasonable timeframe from an unexpected interruption - will result in a zero grade for the required participation or due submissions for the course. Therefore, the following are advised:

- Missing or requiring alternative assessments for assignments greater than 10% of the final grade: Consult the Academic Counsellors in the Engineering Undergraduate Services Office (http://www.eng.uwo.ca/undergraduate/). Students who cannot meet certain academic responsibilities due to medical, compassionate or other legitimate reasons, could request academic consideration. Once approved, the instructor will be informed and invited to discuss arrangements.
- Missing or requiring alternative assessments for assignments worth less than 10% of the final grade: Contact the department administrator to provide documentation and obtain approval. The instructor will then be informed and will be invited to discuss arrangements.
- Needing an extension to the due date: Directly consult the instructor. All the documentation must be provided to the department or EUSO. Do NOT submit any medical documentation to the instructor.

Obtaining appropriate documentation (e.g., a note from the doctor) is valuable when asking for accommodation due to **illness**. For more information concerning medical accommodations, please see:

- http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf

Accessibility and Accommodations

Accessible Education Western (AEW): Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW): http://academicsupport.uwo.ca/accessible_education/index.html

AEW is a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their program staff to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact

- For more information concerning medical accommodations, see the relevant section of the Academic Handbook:
    - http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf
- For more information concerning accommodations for religious holidays, see the relevant section of the Academic Handbook:
    - http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Health and Wellness Services

Services and Resources on Campus: (including any H&D benefits students might have)
As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several health and wellness-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. Information regarding students' health- and wellness-related services may be found at http://www.health.uwo.ca/.
Student Wellness Counselor at Western Engineering: Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, program director, or other relevant administrators in their unit. Faculty of Engineering has a Student Wellness Counsellor. To schedule an appointment with the counsellor, contact Kristen Edwards (khunt29@uwo.ca) via confidential email and the intake office will contact you within 48 hours to schedule an appointment.

Key Contacts:

- **Engineering Undergraduate Services,** http://www.eng.uwo.ca/undergraduate/
- **Services for Students with Disabilities (SSD) at 519-661-2111 ext. 82147 for any specific question regarding accommodation.**
- **Students in emotional/mental distress should refer to Mental Health @ Western, http://www.health.uwo.ca/mental_health/, for a complete list of options for obtaining help.**
- **Office of the Registrar,** http://www.registrar.uwo.ca/
- **Student Development Centre,** http://www.sdc.uwo.ca/
- **USC Student Support Services,** http://westernusc.ca/services/
- **Crisis Contacts:** https://www.uwo.ca/health/crisis.html

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Student Conduct and Conflict Resolution

Online Netiquette: Written language carries a tone, as verbal communication does. Online actions have important social, emotional, and cognitive implications just as in-person actions do. As senior undergraduate students, you will be expected to demonstrate appropriate and professional conduct in all the following, as well as other areas discussed in class:

- Properly addressing the instructor in emails, with appropriate sender information included
- Appropriate time/hours of electronic communication between peers and with the instructor
- Posting and responding to discussion boards or online forums
- Constructively raising concerns about one's experience with the course, peers, or staff (e.g. Teaching Assistant) to the instructor
- Conversations held in group chats with peers

In-Class Norms: The class will discuss healthy norms in the classroom that foster a culture of honour, respect, trust, and authentic engagement. These may include: how technological devices are used, how to raise questions or conduct dynamic discussions, how to minimize undue disruptions in the class activities, etc.

Student Code of Conduct: On the premises of the University, at a University-sponsored program or online educational program, students must abide by the Student Code of Conduct: http://www.uwo.ca/univsec/board/code.pdf. Student misconduct jeopardizes the wellbeing and the quality of learning experience of all students directly or indirectly affected. On the other hand, proper conduct helps build a thriving community and learning environment for all students and staff alike.

The instructor, whenever possible, has the responsibility of addressing and reporting any observed violations of the Student Code of Conduct to the Associate Dean (Undergraduate). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Undergraduate), the student could be debarred from completing the assessment activities in the course as appropriate.

Addressing Student Misconduct: If you observe or experience any misconduct from a fellow student, you are advised to keep a written record of the incident (describe the actions / behaviours), along with the date and useful details about the setting. You can discuss the incident with your instructor, Undergraduate Services Office (https://www.eng.uwo.ca/undergraduate/index.html), the Associate Dean (Undergraduate), and/or Student Office Administration (studentexperience@uwo.ca) in order to simply inform, consult for advice, or determine appropriate actions towards resolution or intervention. Students can, at any time, file a complaint against another undergraduate student's conduct, via the website here:

- https://studentexperience.uwo.ca/student_experience/studentconduct.html

Students should not suffer alone the negative effects of student misconduct or the conflict management process, so you are strongly advised to speak to the aforementioned faculty and staff. There may be different types of support made available, as well as any preventive measures taken as needed.

Conflict Resolution Within the Course: In terms of the group assignments in the course, you are expected to inform and consult the instructor as early as possible when there are behavioural issues affecting the group's performance and team development. The instructor will help identify options for resolution, including any coaching, alternative arrangements or meetings facilitated by the instructor. Please keep a good log of the incidents and the actions taken to address issues.

You must seek input and resources for performance/team management as often as needed. Leaving group issues until near-end of the term (failure to take ownership of addressing the issues) will rule out any options for alternative arrangements, intervention, and/or adjustment of grades.

- End of Syllabus -