Western University – Faculty of Engineering

ES1050 Foundations of Engineering Practice

Course Syllabus 2019-2020

1 Purpose of the course

At the end of the course students will be able to model professional engineering behaviour and work in teams to execute all parts of a systematic design process, including seeking and critically examining information and communicating effectively with clients and other stakeholders.

2 Calendar Description

Introduction to the principles and practices of professional engineering. Team-based design projects provide context for developing research, critical thinking, and problem-solving skills along with professional behaviour. Includes elements of need recognition, conceptualisation, prototyping, and engineering design to satisfy commercial specifications. Emphasis on creativity, teamwork, time management, communication and engineering skills necessary to practice in any engineering discipline.

2.1 Prerequisites:
None.

2.2 Co-requisites:
None.

2.3 Anti-requisites:
None.

Note: It is the student's responsibility to ensure that all Prerequisite and Co-requisite 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 Anti-requisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Co-requisite or Anti-requisite conditions.

2.4 Contact Hours:
Weekly: 1hr combined lecture, 2 hrs lecture/workshop, 2 hrs laboratory/studio, 2 hrs team/tutorial
Section scheduling details can be found at:
https://studentservices.uwo.ca/secure/timetables/mastertt/ttindex.cfm

2.5 Text:
No required text. Lecture notes and supporting course information will be posted to Owl. Students will be required to contribute monetarily towards the construction of prototypes for team projects, as necessary.

2.6 Reference Material:
Suggested readings may be posted to Owl.

2.7 Units:
Both SI and FPS unit systems may be used in lectures, tutorials and all assessments.

3   Instructors

Name	Email	Office	Responsibility
Workshop Instructors			**Workshop**
Dr. John Dickinson, P.Eng. (coordinator)	jdickin5@uwo.ca	ACEB 2410C	001, 002
Dr. Lauren Briens, P.Eng.	lbriens@uwo.ca	SEB 2085	003
Don Uffen, P.Eng.	duffen@uwo.ca	ACEB 2410B	004
Studio Instructors			**Sections**
Dr. John Dickinson, P.Eng. (coordinator)	jdickin5@uwo.ca	ACEB 2410C	006, 015
Dr. Duane Jacques, EIT	djacque4@uwo.ca	TEB 380	007, 010
Dr. Dominic Pjontek, P.Eng.	dpjontek@uwo.ca	TEB 377	008
Joseph Santarelli, EIT	jsantare@uwo.ca	ACEB 2410	009
Dr. Emily Lalone, EIT	emily.lalone@uwo.ca	TEB 353	011
Dr. Jon Southen, P.Eng.	jsouthen@uwo.ca	SEB 3116	012, 017
Manosij Majumdar	mmajumda@uwo.ca	ACEB 2410	013
Louis Ferreira, P. Eng.	lferreir@uwo.ca	TEB 259	014
Dr. Dimitre Karamanev, P.Eng.	dkaraman@uwo.ca	TEB 445	016
Adam Woodhouse	cvandela@uwo.ca	SEB 1071A	Shop Support

Individual Studio Instructors will advise as to additional office hours.

4   General Workload Expectations

- Approximately four one-hour lectures (Tuesday 8:30 NCB 101) spread over the duration of the course. The lecture slot will be used by the Undergraduate Office (see Section 6 for more details).
- Weekly two-hour interactive workshop lecture to four sections of 150 students.
- Weekly two-hour studio design laboratory to twelve sections of 50 students.
- Periodically scheduled weekly two-hour tutorials (Friday 16:30-18:30) to complete weekly deliverables.
- Two hours per week, on average, out-of-class work, including:
  - Preparing for workshops by completing online activities
  - Collaborating with team members on design projects

The typical student is expected to do an average total of about 8 hours a week on this course, but this will vary over the year.

5   Course Learning Outcomes

1. Demonstrate project management skills *(e.g.,* organize, schedule, and track progress on the delivery of a project outcome) in both an individual and a team environment to develop personal resilience and leadership qualities.

   Required Skills:

   - Project Management; Teamwork and Leadership; Time Management; Excel

2. Apply scientific or mathematical principles to evaluate whether information or processes are credible.

   Required Skills:

   - Critical Thinking, Logic and Contextualisation; Basic Assessment; Question Development; Excel

3. Select, apply, adapt, and extend appropriate engineering tools.

   Required Skills:

   - Iteration and Creativity; Comparison and Selection; Vernier Caliper/Metrology; Onshape; Excel

4. Implement the Engineering Design Process to identify and address the client's needs.

   Required Skills:

   - Design Process; Ideation/Needs Identification

5. Model professional behavior, and the ethics of professional engineering, in interactions with peers and supervisors.

   Required Skills:

   - Ethics and Professionalism; Respect

6. Access, review and synthesize relevant information from credible current affairs, science, and trade literature to determine design criteria or the current state of a relevant technology.

   Required Skills:

   - Research; Evidence Interpretation; Critical Thinking; Sustainability

7. Create verbal, written and illustrative media to communicate engineering concepts and deliverables effectively.

   Required Skills:

   - Written Communication; Oral Presentation Skills; Sketching; Design Documentation/Reporting; Prototyping

8. Construct prototypes using safe and appropriate shop techniques to convey design concepts and principles.

   Required Skills:

   - Prototyping; Safety; Sketching; Onshape

9. Describe the professional role/career path opportunities offered in the various engineering disciplines.

   Required Skills:

   - Ethics and Professionalism; Communication

6   Course Delivery

ES1050 will be delivered in a weekly cycle as a combination of; a Tuesday lecture (8:30 – NCB 101) for everyone, a 2-hour blended-learning interactive workshop to learn specific skills and a 2-hour design studio where student teams work on design projects.

6.1   Lectures

Select lectures (approximately 4) will be used by the course instructors to present design theory, good team practices and review course project expectations. The Engineering Undergraduate Office will organise the remaining lectures to cover what it means to be an engineer, associated professional expectations and review skills required to thrive in the high workload and demanding environment encountered in an engineering program and industry. **Attendance is expected and all information** (unless otherwise noted) **is testable**. Lecture outlines will be shared through the course OWL site, but not necessarily lecture slides.

6.2   Interactive Workshops

Coded as lectures in timetables, workshops introduce and develop specific skills required for engineering practice as listed in the Learning Outcomes section above. Skills learned in workshops are expected to be applied in completing team-based design projects (dominantly worked on in the design studios). Workshops are delivered in flipped or blended formats. **This means students are expected to review online material and complete comprehension assessments or other preparatory work before coming to the workshops.** Grades are assigned to the completion of preparatory work.

6.3   Studios (Design Studios)

Coded as laboratories in timetables, studios are the primary instructional spaces for teams to work together on their projects with mentorship and guidance provided by their studio instructors and TAs. Students will be placed into teams of around five within the studios. In these teams, students will be required to complete three design projects over the course of the year. Teams remain the same for duration of each term. **Regular project trackers are to be completed during these sessions.**

6.4   Tutorials

The instructor team will do its best to keep the workload imposed on students by the course reasonable. Friday 16:30-18:30 Tutorials will be used to provide supported time to complete work arising in the week activities. **In general assignments will be due shortly after the tutorial sessions** so they do not carry over into the weekends. Tutorials will be scheduled as required and will be announced through the course Piazza site. Students are encouraged come prepared to workshops and make effective use of these tutorials to complete course work in a timely fashion.

Teams are responsible for scheduling working times outside the course schedule to complete any work not completed in studio sessions.

6.5   Learning Resources

Students will regularly use the following course resources:

OWL Course Site	• Navigate the course • Access pre-workshop lessons, activities, and quizzes • Get and submit some individual and team assignments (limited to specified assignments) • Access support materials for lecture, design project, and studio.
Piazza	• Use as an open course discussion forum • Ask and contribute to course content questions and answers • **Important**: See below for more detail

OneNote Class Notebooks	• Receive weekly instructional content for Design Studio activities • Complete and submit Project Tracker entries
Gradescope	• Get and submit most individual and team assignments

7 Piazza Forum

All ES1050 announcements and communications (questions and answers) shall be done through the Piazza class page. This includes student questions or instructor responses or announcements for: special events, room or schedule changes, updates on assignments or project elements, workshop instructions, etc. The forum allows for progressive addition of detail to questions and answers alike by both instructors and students allowing refinement of postings without making long message queues while allowing anyone to view earlier versions if they wish.

ES1050 is a team learning experience. Students are encouraged (bonus grades can be earned) to support each other's learning by asking good questions and giving good answers in the forum. Course questions or requests for clarification must be posted on Piazza to be responded to and will be ignored if sent directly to instructor's email addresses. **Private/confidential messages (e.g. about grades, accommodations …) can be sent to instructors by setting message visibility to Private.** Instructors reserve the right to change visibility of messages to or from private as appropriate based on content (excluding private content).

Students will be invited by the instructor to join the course forum **but will be removed from the forum if they post abusive or otherwise objectional content**. If removed from the forum, students will be required to meet with the course coordinator to explain their actions and a meeting summary will be sent to the Assistant Dean for inclusion in the student's record.

8 Methods of Evaluation

COURSE MARK BREAKDOWN TABLE

Course mark division	Percentage
Project 1	10 – team and individual
Project 2	15 – team and individual
Project 3	45 – team and individual
Assignments (between 10-15)	20 – individual
Contribution	10 – individual
Bonus Opportunities	Percentage
Psychology Questionnaires	up to 2
Piazza Course Forum Contributions	up to 2

8.1 Projects

- There are three team-based summative projects (Design Project 1, 2, 3)
- Each one has a portion of marks earned individually and team marks earned collectively (see project outlines for details)
- Individual marks are earned by completing project trackers entries

- Team marks are earned through team milestone project deliveries
- Team marks are distributed to individuals (~4 times during the course) using a weighted distribution based on anonymous on-line surveys completed by team members evaluating team member's commitment, communication, knowledge/skills, focus and standards
- On-line team assessments and feedback to team members by students will be assessed for quality and appropriateness by instructors to ensure fair, representative and constructive teamwork feedback is received by all students.
- Studio instructors reserve the right to adjust team grade distribution weightings based on their own observations

In addition to the tracker entries, students are expected to keep notes throughout projects documenting meetings, decisions and capturing ideas. Students are encouraged to keep their personal project notes in their OneNote class notebooks in a separate. Alternatively, bound paper design notebooks are acceptable for personal project note taking. Instructors may ask to review notebooks to address marking or team disputes.

8.2 Assignments

- Individual assessments are designed so that students can acquire, practice, and receive feedback on skills and knowledge required to successfully contribute to team design projects.

8.3 Contribution

- Contribution grades are earned for completing pre-workshop activities and quizzes, ensuring skills introduced to individuals in workshops can be sufficiently developed and practiced to be applied in support of team efforts on the design projects.

8.4 Bonus Opportunities

8.4.1 Psychology Teamwork Research Surveys

- ES1050 partners with the Psychology department to deliver team skills training and complete team work research studies
- Four team surveys will be administered by the Psychology Department during the year and participation in these surveys can earn up to 2% in bonus marks

8.4.2 Piazza Forum Engagement

- At the end of the year a report of instructor endorsed postings on the forum will be used to award students up to an additional 2% in bonus marks on a capped sliding scale

8.5 Late Submissions

It is the student's responsibility to ensure that all assignments are submitted to the specified location on or before the specified due date. **Assignments will be accepted up to an hour late with a flat penalty of 20% of the assignment mark**. Assignments submitted over an hour late will not be accepted without official accommodations. Some key assignments, as noted in their submission requirements, will not be accepted late at all without an officially approved accommodation.

Student's choosing to self-report an absence for academic considerations as outlined in https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf that miss an assignment deadline must ensure 1) they notify the instructor of their expected period of absence and 2) they submit the assignment 48 hours after their absence for academic considerations is over.

To ensure consistency between studio sections, grades for projects and assignments may be normalized. The procedure for normalizing grades will be made available, if necessary.

8.6 Use of English

In accordance with Senate and Faculty Policy, students may be penalized 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 final examinations 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.

8.7 Cheating

University policy states that cheating, including **plagiarism**, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning. The University of Western Ontario uses software for plagiarism checking. Students are required to submit certain reports in electronic form to Turnitin.com for plagiarism checking (which is connected to the OWL submission site). For more information on scholastic offenses, please see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf . Penalties for plagiarism on reports will start with, but are not limited to, partial or complete loss of marks on the assignment.

8.8 Attendance

Any student who, fails to attend 80% of a course component, or in the opinion of the Studio Instructor, is absent too frequently from lecture/workshop, laboratory/studio, or other course instructional sessions shall be removed from their project team and required to meet with the Course Coordinator. The meeting will review the reasons for the student's absences and establish consequences and any conditions that must be satisfied for the student to return to active participation in team elements of the course. The outcome of the meeting will be summarized and communicated to the Assistant Dean, First Year Studies, to be included in the student's file. On the recommendation of their Studio Instructor, and with the permission of the Assistant Dean, First Year Studies, the student can be debarred from further participation in the course and from sharing in any grades from ongoing team project work.

Student's choosing to self-report absences for academic considerations as outlined in https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf must ensure they do not fall below attendance thresholds set to ensure fair team contributions and are strongly recommended to discuss any needs for prolonged or multiple absences with their studio instructor or the Undergraduate Office.

Some activities cannot be made-up if missed, including community partner meetings, specialized workshops or studio sessions. If the missed session had course grading elements associated with it, students are expected to communicate with their studio instructor (for studio related activities) or course coordinator (for all other activities) to address grading expectations.

8.9 Sickness and Other Problems

Students should immediately notify their Studio Instructor by private Piazza communication (select post to individual with instructor name) if they have any problems that could affect their performance in the course. Immediate notification is required to ensure teamwork components of the course are not adversely affected. If the Studio Instructor does not respond students should contact the course coordinator or the Undergraduate

Services Office, SEB 2097. Where appropriate, the problems should be documented. The student should seek advice from their Studio Instructor about how to deal with the problem as it relates to their performance and their team's performance in the course. For more information concerning medical accommodations, please see: **http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf**

9   Student Conduct & Behaviour

Students are expected to **arrive at course sessions on time**, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others. **Please turn off your cell phone before coming to a class, tutorial, quiz or exam.** On the premises of the University or at a University-sponsored program, students must abide by the Code of Student Conduct:
https://www.uwo.ca/univsec/pdf/board/code.pdf

9.1   Notification

Students are responsible for checking their university email account (**@uwo.ca**) and the course Piazza page regularly to receive notices posted by the Instructors regarding the ES 1050 course. When communicating with instructors by email, students are expected to use their university email account.

9.2   Consultation

Students are encouraged to discuss problems with their Tutorial Assistants (TAs) and/or Studio Instructor during Studio or Team Meeting sessions. Additional consultations or office hours will be arranged for students to meet Studio Instructors and Tutorial Assistants upon request.

Students are expected to use the course Piazza page to ask any general course content related questions (e.g. logistics, assessment clarifications, variations or alternate approaches, …) and use the private visibility setting to address private issues (e.g. course marks, accommodations …). Students are strongly encouraged to support each other in this forum and course instructors will moderate and correct responses in the forum for the benefit of all students. Last minute questions (24 hours before a deadline) about assignments will not be addressed by instructional members. Emails directly to instructors will also be ignored.

Unprofessional behavior in the forum will be cause for any or all of the following: being called to discuss with instructor/coordinator, loss of Contribution marks, being banned from participating in the discussion forum, and further penalties as outline in the University Code of Student Conduct.

9.3   Accessibility

Please contact the course coordinator 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 Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

9.4   Device Use

Laptops or mobile devices can support your learning in this course, but they can also be a source of distraction for you and other students around you. Please turn off all sound notifications before you enter the lecture hall, workshops or studios. You are welcome to use your devices for course-related activities such as taking notes, researching lecture topics, collaborating on group projects, viewing documents in OWL, and communicating with other students about the course material. You are not permitted to use these devices for any non-course-related activities. During activities that do not require these devices, such as group discussions, you are expected

to close or put them away. If you have concerns or comments about how the use of laptops or mobile devices is affecting your learning during the course, please make an appointment to talk with the course coordinator.

9.5 Recordings

The course intellectual content belongs to the instructors and/or the Faculty of Engineering. The recording of audio, video or pictures by students is strongly discouraged for privacy reasons. Recordings made with instructor's permission are strictly limited for use in study for this course and may not be shared without express permission. Any recording of course activities taken by course instructors will only be used to improve course delivery, instructional content or feedback to students, unless otherwise notified. 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 video of workshop activities for illustrating future instructional material.

Photos and videos will be taken at major course events to promote public engagement at future events, to promote Western University's Engineering program, and to improve instructional materials for future ES1050 courses. Student's wishing to discuss the collection and use of recordings during course activities should contact the course coordinator.

10 Course Revisions

The instructors reserve the right to adjust course content and/or delivery if required to meet faculty, program and course academic objectives.

11 Accreditation Units

Engineering Design	50%
Engineering Science	25%
Complementary Studies	25%

The document "*INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMINT ASSIGNMENTS AS SCHEDULED*" is part of this course outline.