

# ES1050 Foundations of Engineering Practice

Course Outline 2018-2019

## 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.

## 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.

### Prerequisites:

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.

### Co-requisites:

None.

### Anti-requisites:

None.

### Contact Hours:

Weekly: 1 hr 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>

### 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.

### Reference Material:

Suggested readings may be posted to Owl.

### Units:

Both SI and FPS unit systems may be used in lectures, tutorials and examinations.

## Instructors

Name	Email	Office	Responsibility
<b>Workshop Instructors</b>			<b>Workshop</b>
Dr. John Dickinson, P.Eng. (coordinator)	jdickin5@uwo.ca	ThreeC+ 2410C	003, 004
Jennifer MacDonald, P.Eng.	jmacd84@uwo.ca	Offsite	002
Dr. Lauren Briens, P.Eng.	lbriens@uwo.ca	SEB 2084	001
<b>Studio Instructors</b>			<b>Sections</b>
Dr. John Dickinson, P.Eng. (coordinator)	jdickin5@uwo.ca	ThreeC+ 2410C	014, 015
Dr. Jon Southen, P.Eng.	jsouthen@uwo.ca	SEB 3116	016, 017
Dr. Eric Johlin	ejohlin@uwo.ca	SEB 3094	008
Dr. Takashi Kuboki	tkuboki@uwo.ca	CMLP 1306	007
Dr. Duane Jacques	djacque4@uwo.ca	TEB 380	010, 011
Dr. Ying Zheng	ying.zheng@uwo.ca	TEB 465	009
Dr. Dan Langohr, EIT	glangohr@uwo.ca	SEB 2063A	012
Dr. Emily Lalone, EIT	emily.lalone@uwo.ca	TEB 353	006
Dr. Shahzad Barghi, P. Eng.	sbarghi2@uwo.ca	TEB 447	013
Chris Vandelaar	cvandela@uwo.ca	CMLP 63A	Mfg. and CAD support

Individual Studio Instructors will advise as to additional office hours.

## General Workload Expectations

- Weekly one-hour lecture to whole class (reduced in second term)
- Weekly two-hour interactive workshop lecture to four sections of 150 students
- Weekly two-hour studio design laboratory to twelve sections of 50 students
- (Optional weekly two-hour tutorial for students who need extra help or use that time to work on their team projects)
- Four hours per week, on average, out-of-class work, including:
  - Preparing for workshops by completing online activities
  - Collaborating with team members on design projects
  - Completing assignments

The typical student is expected to do an average total of about 9 hours a week on this course, but this will vary over the year.

## 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:

- Library 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

## Course Delivery

ES1050 will be delivered in a weekly cycle as a combination of; a lecture to start the week, a 2-hour blended interactive workshop to learn specific skills and a 2-hour design studio where student teams work on design projects.

### Lectures

Lectures will be used to convey essential knowledge required to progress in their design projects.

**Attendance is expected and all information (unless otherwise noted) is testable.** Lecture outlines will be shared through the course OWL site, but not complete lecture slides.

### 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). **Students are expected to review online material before their scheduled workshops and complete comprehension assessments or other preparatory work before coming to the workshops.** Grades are assigned to the completion of preparatory work.

### 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 two design projects over the course of the year. Teams remain the same for the entire year. **Regular project trackers are to be completed during these sessions.**

## Learning Resources

Students will regularly use the following course resources:

<b>OWL Course Site</b>	<ul style="list-style-type: none"><li>• Navigate the course</li><li>• Access pre-workshop lessons, activities, and quizzes</li><li>• Get and submit individual and team assignments</li><li>• Access support materials for lecture, design project, and studio.</li></ul>
<b>Piazza</b>	<ul style="list-style-type: none"><li>• Use as an open course discussion forum</li><li>• Ask and contribute to course content questions and answers</li></ul>
<b>OneNote Class Notebooks</b>	<ul style="list-style-type: none"><li>• Receive weekly instructional content for Design Studio activities</li><li>• Complete and submit Project Tracker entries</li></ul>

## Methods of Evaluation

There are two summative projects (Design Project A and Design Project B), and a number of related assessments and milestones in this course. The related assessments are designed so that students can acquire, practice, and receive feedback on skills required for successfully completing the design projects and achieving the outcomes of this course.

Design project deliverables earn marks for the team as a whole. A weighted distribution will be used to assign individual team members these marks based on studio instructor observations and on anonymous on-line assessments of each team member's commitment, communication, knowledge/skills, focus and standards (~5 times during the course). **Participation in team work is mandatory for all students.**

Project trackers will be completed in design studios and record individual and team efforts towards project requirements. Beyond the project trackers, students are expected to keep notes throughout projects documenting meetings, decisions and capturing ideas. Students are encouraged to keep their notes in their OneNote class notebooks in separate sections. Bound paper design notebooks are an acceptable alternative for personal design note taking.

Contribution grades will be awarded for completing pre-workshop activities and quizzes, ensuring skills introduced to individuals in workshops are sufficiently developed and practiced and thus ready to be contributed to team efforts on the design projects.

Finally, three team surveys will be administered by the Psychology Department Teamwork Lab during the year and participation in these surveys can earn up to 2% in bonus marks.

## COURSE MARK BREAKDOWN TABLE

Item	Course Percentage
<b>Project A</b>	10 – team
<b>Project B</b>	30 – team
<b>Project Trackers</b>	10 – individual
<b>State of the Art report (SOTA)</b>	10 – individual
<b>Assignments (11-15 in total)</b>	20 – individual
<b>Contribution (Pre-workshop)</b>	5 – individual
<b>Mid-Year Exam</b>	8 – individual
<b>Final Exam</b>	7 – individual
<b>Team Survey</b>	(up to 2 bonus)

It is the student's responsibility to ensure that all assignments are submitted to the specified location on or before the specified due date. Late assignments will be docked a flat penalty of 20% of the assignment mark per day. Some key assignments, as noted in their submission requirements, will not be accepted late without an officially approved accommodation.

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.

### 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.

### 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](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.

### Attendance

Any student who, in the opinion of the Studio Instructor, is absent too frequently from lecture, laboratory, or tutorial periods (which includes all sessions in lecture-hall, workshop, studio, or team-meeting formats) will be reported to the Assistant Dean, First Year Studies (after due warning has been given). On the recommendation of their Studio Instructor, and with the permission of the Assistant Dean, First Year Studies, the student will be debarred from sharing in the grade from the team project.

## Sickness and Other Problems

Students should immediately notify their Studio Instructor by electronic mail 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 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](http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf)

## Student Conduct & Behaviour

Students are expected to **arrive at lectures 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>

## Notification

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

## 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, ...). Any email received by instructors directly on these topics will be ignored. Students are 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.

**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.

## 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.

## 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.

## 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 showcase 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.

## Accreditation Units

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

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