Engineering Strategies and Practice

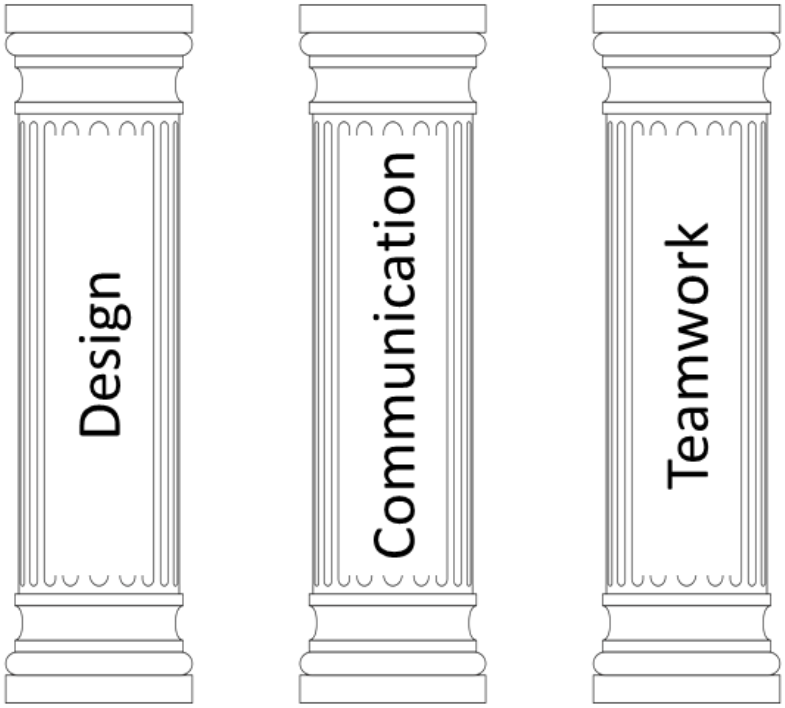

Figure 1: Three pillars of Engineering Strategies and Practice (ESP)

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1 WHAT IS ENGINEERING STRATEGIES AND PRACTICE (ESP)?

Engineering Strategies and Practice (ESP) is a foundational design course sequence that uses the engineering design process as a context for developing skills essential to the practice of engineering. It is composed of two courses, APS111: Engineering Strategies and Practice I in the fall term and APS112: Engineering Strategies and Practice II in the winter term.

Both courses challenge you to use your engineering design skills to solve your client's problem. You will learn and follow a formal design process to increase the credibility and efficiency of your design work. You will learn to prepare written and oral reports to make persuasive engineering arguments supporting your recommended solutions. Finally, you will achieve all this while working productively with a randomly selected team of your peers (See Figure 1).

2 WHAT IS ESP I (APS111)?

ESP I introduces the design process through a design project common to all teams. In your assigned team you will design an engineering solution for a real problem, though this term you will not have direct contact with your client. The deliverable for the fall term will be a conceptual design. You will grapple with the challenges of an engineering design problem while working effectively in a team. Writing, reading, using visuals and other forms of communication, as engineering activities, are introduced. You will learn how to identify and consider upfront design factors such as interest holders and service environment.

3 TEACHING TEAM

All of the activities in the course fall under one or more of the "three pillars" of course content, as depicted on the cover page of this syllabus (Figure 1). The teaching team is also organized around those three pillars. Here is an overview of the teaching team:

- Design Coordinator and Lecturers: Focused on the design aspects of the course.
- Teamwork Coordinator and Lecturer: Focused on the teamwork aspects of the course.
- Communication Coordinator and Lecturer: Focused on the communication aspects of the course.

Note that the "three pillars" of the course are usually not strictly separated from each other, but often overlap. This will be reflected in the lecture content, as well as your work in the course.

In addition to the Lecturers and Coordinators, your tutorials will be led by a Teaching Assistant and a Communication Instructor. Their duties are described below.

- Teaching Assistant (TA): Focused on design content, design documents and professionalism. Will provide feedback on teamwork and communication issues as well, especially as they impact design work. TAs are the final authority on all design guidance and assessment in the tutorial.
- Communication Instructor (CI): Focused on all forms of communication and teamwork, including documentation, team communication and organization. CIs will also discuss design work with you, while respecting the TA's role as the primary design authority.

4 What are the Course Learning Objectives?

The following are four high level learning objectives for ESP I. You can expect these to be discussed in lectures and in textbook readings. They will be applied and evaluated in course assessments. Please check the Course Learning Objectives document for a breakdown of these high level learning objectives.

By the end of this course, you should be able to:

- Produce a credible design recommendation, defining functions, objectives and constraints with metrics to measure their success, with appropriate documentation, in response to a client request.
- Address broader considerations in design, including the concerns of interest holders and service environment.
- Follow a team process to work effectively in a team, make team decisions and produce a team created deliverable.
- Apply the principles behind professional multimodal engineering communication for interpersonal interactions and to produce documents and presentations for clients, professors, and design team members.

5 How Will I Be Evaluated in This Course?

Your ability to meet the Learning Objectives of this course will be assessed with a wide range of assignments and activities. There are two types of assessments in ESP.

5.1 Individual Assessments

You are expected to complete Individual Assessments on your own without the direct assistance of your team. Only you will receive the grade for these assessments.

5.2 Team Assessments

You are expected to work with your team on these assessments and contribute equitably. These assessments will be evaluated as a whole and nominally all team members will receive the same grade. However, if your assessor determines there has been an under-contribution from an individual, they will assign an individual penalty to that team member. Over-contribution of team members is not rewarded with additional marks, so it is important to have clear expectations of all team members and contingency plans in place. These will be captured in your Team Charter.

Where applicable, your assessor will also apply team penalties to all team members. For example, late submission penalties will be strictly enforced.

Your final grade will not benefit from your team assessments if you have not met the individual mastery policy (See Course Policies document).

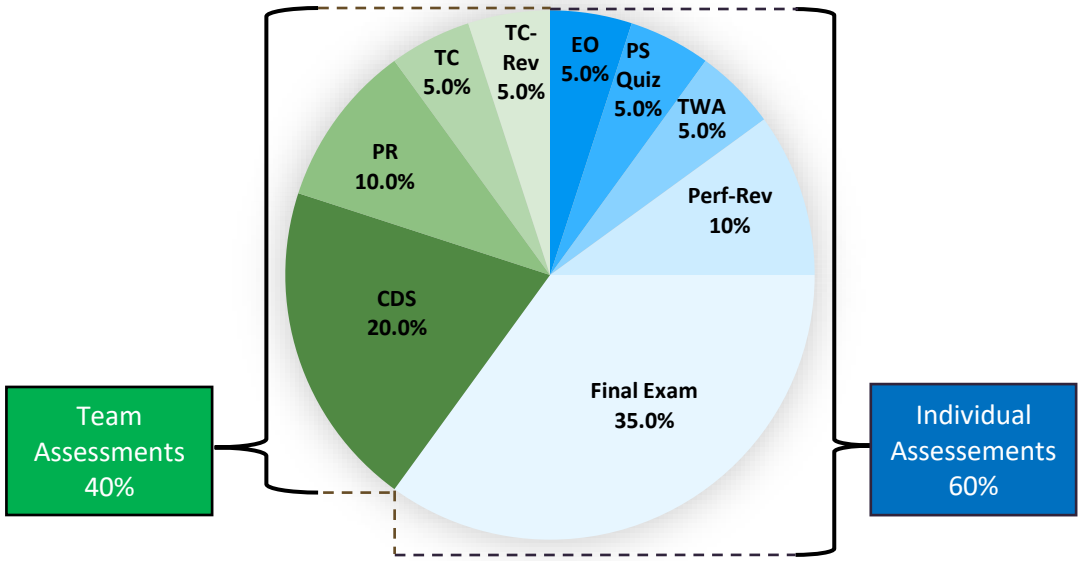

Figure 2: Pie chart mark breakdown for ESP I

Table 1: Mark breakdown for ESP I

Assessments	% Final Grade	Assessor
Individual Assessments		
Engineering Observation (EO)	5	CI
Problem Statement Quiz (PSQ)	5	TA
Teamwork Analysis (TWA)	5	CI
Performance Review (Perf-Rev)	10	TA
Final Exam[1]	35	-
Individual Assessment Total	**60%**	
Team Assessments[2]		
Team Charter (TC)	5	CI
Team Charter Revision (TC-Rev)	5	CI
Design Project Assessments		
Project Requirements (PR)	10	TA
Conceptual Design Specification (CDS)	20	TA
Team Assessment Total	**40%**	
FINAL GRADE	**100%**	

[1] Writing the Final Exam is a mandatory component of the course.
[2] Participation in all the team assessments is a mandatory component of the course.

6 CAN I USE ARTIFICIAL INTELLIGENCE (AI) IN MY ASSIGNMENTS?

The expectation is that students, whether individually or as a team, will submit original work as per the Course Policies document and that students are ultimately accountable for the work that they submit. Unless otherwise specified on an assignment, students may choose to use generative artificial intelligence tools as they work through the assignments in this course; this use must be documented in an appendix for each assignment. See the full AI policy in the Course Policies Document.

7 WHAT DO I NEED TO ATTEND?

The three main activities in this course are detailed below. All three are mandatory, but only the lectures and tutorials will be attended by members of the teaching team. The detailed schedule for the course can be found in Quercus.

7.1 LECTURES

Lectures in this course both re-enforce content in the textbook readings AND introduce material not included in the readings. Therefore, you need to attend all lectures. If you are unavoidably absent from a lecture, then it is your responsibility to learn the content by viewing the lecture recordings or lecturette videos posted in Quercus. This substitution should only be used as an occasional exception, such as when you are unexpectedly ill. The videos do not contain the activities used in lectures to re-enforce the learning. It is preferrable to attend the in-person lectures whenever possible. If absence from lectures is going to be a more frequent occurrence, then speak to the teaching team as soon as possible.

After Week 03 of the term, you will be sitting in lecture with your team. Therefore, you must attend lectures to contribute equitably to the project. Before Week 04 you may sit anywhere.

The topics for each lecture can be found in the Module for that week.

- *Type*: Synchronous In-person (Instructors in Attendance)
- *Requirement*: Mandatory Attendance
- *Scope*: 3 hours per week
- *Recorded*: Yes
- *Location*: MY150

7.2 TUTORIALS

Weekly Tutorials are mandatory, supervised work periods during which you will work as a team on their team design project. The specific tasks for each tutorial will be laid out in the tutorial agenda, but it is the responsibility of the team to organize themselves to complete these tasks. If tasks are not completed during tutorial they will need to be completed outside tutorial. Punctual attendance and engagement in the tutorials will be reflected in the Performance Review grade.

The agenda for each tutorial is found on Quercus in the module for that week.

- *Type*: Synchronous In-person (TA and CI in Attendance)

- *Timing*: As per individual student timetable
- *Requirement*: Mandatory Attendance (Punctual attendance is factored into P-Rev)
- *Scope*: 2 hours per week starting Week 03 (There are no tutorials in Weeks 01 & 02)
- *Recorded*: No
- *Location*: As per individual student timetable

7.3 Team Meetings

There is not enough time in tutorials to complete your project. You must meet with your team outside of lectures and tutorials to achieve the course Learning Objectives. These meetings will not normally be attended by members of the teaching team unless arranged ahead of time for special circumstances.

- *Type*: Synchronous In-person / Online (Only Students in Attendance)
- *Timing*: As scheduled by your team, but only after Week 04
- *Requirement*: Mandatory Attendance. The teaching team will not be tracking this attendance; however, attendance issues may be discussed in team work mediation meetings.
- *Scope*: Estimated 2 hours per week starting Week 04. This will increase greatly just before a team assignment deadline.
- *Recorded*: No
- *Location*: As scheduled by team

8 What Do I Need to Read?

Textbook: *Designing Engineers: An Introductory Textbook* by S. McCahan, P. Anderson, M. Kortschot, P. Weiss, and K. Woodhouse. You may purchase it in either digital or hard copy from multiple sources.

Other Readings: Posted on Quercus.

The assigned readings will be posted on Quercus and the Perusall textbook platform.

9 Accommodations

The University of Toronto supports accommodations for students with diverse learning needs, which may be associated with mental health conditions, learning disabilities, autism spectrum, ADHD, mobility impairments, functional/fine motor impairments, concussion or head injury, visual impairments, chronic health conditions, addictions, D/deaf, deafened or hard of hearing, communication disorders and/or temporary disabilities, such as fractures and severe sprains, or recovery from an operation.

If you have a learning need requiring accommodation the University of Toronto recommends that students register with Accessibility Services as soon as possible. Register at: https://studentlife.utoronto.ca/service/accessibility-services-registration-and-documentation-requirements/

We know that many students avoid seeking help because they feel that they should not need “unfair advantages.” The purpose of academic accommodation is not to give an unfair advantage, but to help

remove an unfair disadvantage. It may feel difficult to ask for help, but it can make all the difference during your time here.

Phone: 416-978-8060

Email: accessibility.services@utoronto.ca

10 MENTAL HEALTH

Engineering at the University of Toronto is a demanding program. The workload and the frequency of assignments and tests can be challenging to balance and can feel overwhelming. As a result, students can find themselves experiencing physical and/or mental health issues which impact their academic performance and overall well-being.

If you find yourself feeling distressed and in need of more immediate support resources, consider reaching out to the counsellors at My Student Support Program (MySSP) (www.uoft.me/myssp) or visiting U of T Engineering's Urgent Support – Talk to Someone Right Now webpage (https://uofteng.ca/talknow).

If you are encountering challenges that significantly affect your academic performance and overall wellbeing, there are a variety of free and confidential supports that can help you. As a U of T Engineering student, you have a First-Year Advisor (www.uoft.me/fyo), a Departmental Upper-Year Undergraduate Advisor (www.uoft.me/engadvisors), or a Departmental Graduate Administrator (www.uoft.me/gradadmin) who can advise on personal matters that impact your academics. You can find helpful people, services and resources like these listed on the U of T Engineering Mental Health & Wellness webpage (www.uofteng.ca/mentalhealth).

A small selection is also included here:

- Accessibility Services (www.studentlife.utoronto.ca/as)
    - On-Location Accessibility Advisor (www.uofteng.ca/onlocationaccessibility)
- Health & Wellness (www.healthandwellness.utoronto.ca)
    - On-Location Health & Wellness Engineering Counsellor (www.uoft.me/wellnessadvisor)
- Registrar's Office (https://uoft.me/eng-registrar)
- U of T Engineering's Learning Strategist (www.uoft.me/englearningstrategist)
- U of T Engineering's Mental Health Programs Officer (www.uofteng.ca/mentalhealth#MHPO)
- U of T Engineering's Scholarships & Financial Aid Office and Advisor (www.uoft.me/engfinance)

We encourage you to access these resources as soon as you feel you need support; no issue is too small.

11 INCLUSIVITY STATEMENT

You belong here. The University of Toronto Engineering commits to all students, instructors, staff, alumni and partners that you can learn, create and participate in a welcoming, healthy and respectful environment. In this class, the participation and perspectives of everyone is invited and encouraged. The broad range of identities and intersections of identities within an inclusive team environment will help

you achieve academic success. You can read the evidence for this approach on inclusion and diversity here: https:/www.weforum.org/agenda/2019/04/business-case-for-diversity-in-the-workplace/.

You are not alone. You are invited to talk to anyone in the Faculty that you feel comfortable approaching, including your professor, teaching assistant, academic advisor, any staff member, the Engineering Equity Diversity & Inclusion Action Group, a culture or identity club or group, or a U of T Equity Office.

Academic Advisors: https://undergrad.engineering.utoronto.ca/first-year-office-2/first-year-office-team/

Engineering Equity, Diversity & Inclusion Action Group & Clubs: www.uofteng.ca/edi

U of T Equity Offices: https://hrandequity.utoronto.ca/inclusion/equity-offices/

You have rights under the Ontario Human Rights Code that protect you against all forms of harassment or discrimination, including but not limited to acts of racism, sexism, Islamophobia, anti-Semitism, homophobia, transphobia, ableism and ageism. Engineering denounces unprofessionalism or intolerance of any kind, whether in person or online, on or off-campus. If you experience or witness any of these behaviours, please tell someone so we can help with resources and resolution. Engineering takes these reports extremely seriously. You can confidentially disclose directly to Marisa Sterling, P.Eng, Assistant Dean, Diversity, Inclusion and Professionalism.

Phone: 416.946.3986

Email: disclosure.engineering@utoronto.ca

Submit confidential disclosure form: www.uofteng.ca/disclosure

Ontario Human Rights Code: http://www.ohrc.on.ca/en/students%E2%80%99-handouts/fact-sheet-1-ontario-human-rights-code

12 Acknowledgment of Traditional Land

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

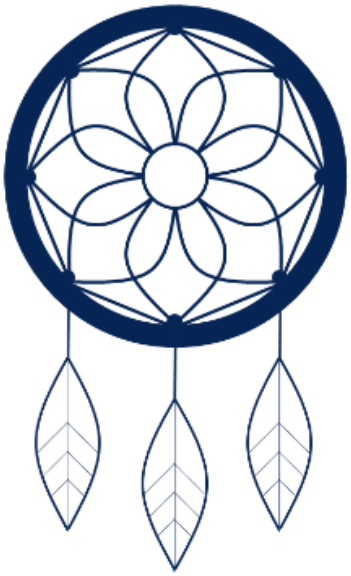

Figure 3: Stylized Dreamcatcher originally from the Anishinaabe First Nation People it is now considered by many to be a common symbol of the Indigenous People on Turtle Island (North America).