



ORIGINAL COURSE IMPLEMENTATION DATE: September 2021  
 REVISED COURSE IMPLEMENTATION DATE: September 2026  
 COURSE TO BE REVIEWED (six years after UEC approval): March 2032  
 Course outline form version: 29/08/2024

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

<b>Course Code and Number:</b> ENGR 124	<b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>										
<b>Course Full Title:</b> Engineering Design II: Design and Sustainability <b>Course Short Title:</b> Engineering Design II											
<b>Faculty:</b> Faculty of Applied and Technical Studies	<b>Department/School:</b> Physics										
<b>Calendar Description:</b> Expands on student's understanding of engineering design as applied to larger, more self-directed projects. Working in groups, students will follow a structured process to design a system comprising of electrical, mechanical, and software sub-systems over the term. Students will complete one major project through several milestone stages with associated technical reporting. This course includes an introduction to the concept of sustainability and its impact on engineering design, and an exposure to engineering ethics.											
<b>Prerequisites (or NONE):</b>	ENGR 123 and PHYS 111. One of ENGR 153 or COMP 152 is highly recommended.										
<b>Corequisites (if applicable, or NONE):</b>											
<b>Pre/corequisites (if applicable, or NONE):</b>	MATH 112 and (PHYS 112 or PHYS 118).										
<b>Antirequisite Courses</b> ( <i>Cannot be taken for additional credit.</i> ) Former course code/number: Cross-listed with: Equivalent course(s): <i>(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)</i>	<b>Course Details</b> Special Topics course: <b>No</b> <i>(If yes, the course will be offered under different letter designations representing different topics.)</i> Directed Study course: <b>No</b> <i>(See <a href="#">policy 207</a> for more information.)</i> Grading System: <b>Letter grades</b> Delivery Mode: <b>May be offered in multiple delivery modes</b> Expected frequency: <b>Winter only</b> Maximum enrolment (for information only): <b>24</b>										
<b>Typical Structure of Instructional Hours</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Lecture/seminar</td> <td style="text-align: center;">45</td> </tr> <tr> <td>Supervised laboratory hours (computer lab)</td> <td style="text-align: center;">30</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td style="text-align: right;"><b>Total hours</b></td> <td style="text-align: center;"><b>75</b></td> </tr> </table>	Lecture/seminar	45	Supervised laboratory hours (computer lab)	30					<b>Total hours</b>	<b>75</b>	<b>Prior Learning Assessment and Recognition (PLAR)</b> PLAR cannot be awarded for this course because: Content and instruction are mandates by governing body.
Lecture/seminar	45										
Supervised laboratory hours (computer lab)	30										
<b>Total hours</b>	<b>75</b>										
<b>Scheduled Laboratory Hours</b> Labs to be scheduled independent of lecture hours: <b>No</b>	<b>Transfer Credit</b> (See <a href="http://bctransferguide.ca">bctransferguide.ca</a> ) Transfer credit already exists: <b>Yes</b> Submit outline for (re)articulation: <b>Yes</b> <i>(If yes, fill in <a href="#">transfer credit form</a>.)</i>										
<b>Department approval</b>	<b>Date of meeting:</b> September 2025										
<b>Faculty Council approval</b>	<b>Date of meeting:</b> October 9, 2025										
<b>Undergraduate Education Committee (UEC) approval</b>	<b>Date of meeting:</b> March 27, 2026										

**Learning Outcomes** *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Apply the engineering design process to open-ended engineering design problems.
2. Apply mechanical and electrical concepts, modelling tools, and software principles to the understanding and analysis of engineering problems, and to the design of potential solutions at the appropriate level.
3. Participate equitably as a member of a team, demonstrating initiative, professionalism, and effective intra-team communication.
4. Deliver original and effective oral presentations, and technical reports.
5. Describe the principles of sustainability, "cradle-to-grave", "cradle-to-gate", and product life cycle, and apply these principles to engineering design and decision making through processes such as life cycle assessments.
6. Apply engineering tools, including hand tools, prototyping tools, and software tools to create, test, and analyze physical embodiments of an engineering design.
7. Demonstrate ethical behaviour and describe the importance of the engineering codes of ethics, both at the student and professional level.
8. Explain the importance of life-long learning and continuing professional development for professional engineers.
9. Describe the contributions that an engineer can make to society as well as the impact (both positive and negative) that an engineering project can have on society.
10. Explain the importance of Engineers and Geoscientists BC guidelines for Indigenization and Reconciliation and how they apply to aspects of professional practice, such as project management, sustainability, and ethics.
11. Explain Engineers and Geoscientists BC programs and initiatives for Equity, Diversity, and Inclusion.

**Recommended Evaluation Methods and Weighting** *(Evaluation should align to learning outcomes.)*

Final exam:	35%	Project:	25%	Quizzes/tests/midterm:	15%
Assignments:	15%	Lab work:	10%		%

**Details:**

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Instructional Methods** *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lecture and lab.

**Texts and Resource Materials** *(Include online resources and Indigenous knowledge sources. [Open Educational Resources](#) (OER) should be included whenever possible. If more space is required, use the [Supplemental Texts and Resource Materials form](#).)*

Type	Author or description	Title and publication/access details	Year
1. Textbook	Ostafichuk and Jaeger	Introduction to Engineering	2023
2. Textbook	Dunwoody, B et.al.	Fundamental Competencies for Engineers	2017
3.			

**Course Content and Topics**

This course is only to be taught by a licensed Professional Engineer.

**Module 1: Engineering Design Process (10:10)**

- Project Management
- Human Design Factors
- Risk Management
- Engineering Fundamentals

**Module 2: Designing for the Environment (12:12)**

- Pillars of Sustainability
- Life Cycle Assessment
- Impact of human activity on health, safety, and environmental systems

**Module 3: Engineering Ethics (4:0)**

- Describe the Engineering Code of Ethics
- Apply Ethical Conflict Resolution

Note: Some lab exercises and lecture material will draw from more than one topic area.