



Engineering Design 1 – ENGR 101

University Studies Program

Course Outline

COURSE IMPLEMENTATION DATE: September 2021
OUTLINE EFFECTIVE DATE: September 2023
COURSE OUTLINE REVIEW DATE: April 2028

GENERAL COURSE DESCRIPTION:

An introduction to the principles of the engineering design process, engineering drawing and CAD tools, project/group dynamics, professional responsibility, and writing and presentation skills. This knowledge will be applied to case studies and practical projects to be undertaken by teams of students.

Program Information: This course is a requirement for all students completing the Common Engineering Curriculum. It is a pre-requisite for Engineering Design II (ENGR 102).

Delivery: This course is delivered face-to-face.

COTR Credits: 3

Hours for this course: 60 hours

Typical Structure of Instructional Hours:

| Instructional Activity | Duration |
|------------------------------|-----------|
| Lecture Hours | 30 |
| Seminars / Tutorials | |
| Laboratory / Studio Hours | 30 |
| Practicum / Field Experience | |
| Other Contact Hours | |
| Total | 60 |

Practicum Hours (if applicable):

| Type of Practicum | Duration |
|------------------------|----------|
| On-the-Job Experience | N/A |
| Formal Work Experience | N/A |
| Other | N/A |
| Total | |

Course Outline Author or Contact:

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Signature

APPROVAL SIGNATURES:

Department Head
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Department Head Signature

Dean Signature

EDCO

Valid from: September 2023- April 2028

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT:

Prerequisites:

- Minimum 65% in either MATH 090, MATH 100, Pre-Calculus 12, Principles of Math 12, or equivalent; or any grade in Pre-Calculus 12 and 75% or higher in Calculus 12.
- Minimum 65% in either PHYS 090, Physics 12, or equivalent.
- Must be registered in the ENGR program.
- PHYS 103, MATH 103 and CSCI 105 are required courses, either taken prior or concurrently.

Corequisites:

Flexible Assessment (FA):

Credit can be awarded for this course through FA Yes No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

Transfer Credit: For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Student should also contact an academic advisor at the institution where they want transfer credit.

Textbooks and Required Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Bethune, James D. (2017). Engineering Graphics with AutoCAD 2017, New Jersey: Pearson Education publishing as Prentice Hall. ISBN 10 0-130450696-0 or ISBN: 13 978-0-13-450696-8

Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> for a complete list of the currently required textbooks.

LEARNING OUTCOMES:

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

Engineering Profession

- Describe the unique aspects of the engineering profession
- Describe the different engineering disciplines and specializations, with an emphasis on programs offered at institutions in British Columbia

Engineering Design

- Describe/identify tools within each Engineering Design Process step
- Identify and engage stakeholders
- Identify project scope (function/constraints)
- Use brainstorming and creative tools
- Apply formal decision processes (e.g. Pugh, weighted decision matrix)
- Build/test prototypes

Engineering Drawing

- Demonstrate ability to draw engineering 2D sketches and orthographic views
- Demonstrate ability to draw engineering 3D isometric and perspective sketches
- Use lines/angles/dimensioning in a drawing
- Demonstrate CAD (e.g. Solidworks, 3D Fusion or similar) up to and including 3D sketching, exploded views.
- Produce prototypes by interfacing CAD with fabrication tools (e.g. 3D printers)

Professionalism/Ethics, Social/Professional Responsibility

- 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

Teamwork

- Understand group dynamics theory (e.g. Tuckman model)
- Describe models for building successful teams
- Apply conflict resolution techniques
- Give/receive feedback effectively
- Participate equitably as a member of a team, demonstrating initiative, professionalism, and effective intra-team communication

Project work

- Client-based (e.g. the client prescribes the scope and constraints and verifies delivery)
- Consider regulatory constraints, the business case, stakeholder interests and environmental considerations as part of an iterative project design
- Prepare and deliver effective technical reports and presentations

COURSE TOPICS:

- Engineering Profession
- Engineering Design Process
 - Introduction to Team Work
 - Communication
 - Engineering Design Process
 - Engineering Fundamentals
- Engineering Drawing
 - Isometric / Orthographic
 - Computer Aided Drawing
 - 3D Rendering / Prototyping Tools

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

EVALUATION AND ASSESSMENT (Face-to-Face Delivery):

| Assignments | % of Total Grade |
|---|------------------|
| Lecture - Assignments / In-Class Activities | 10% |
| - Midterm | 15% |
| - Final Exam | 35% |
| Laboratory | |
| - Lab Exercises | 10% |
| - Projects | <u>30%</u> |
| Total: | 100% |

In order to pass the course, a passing grade (50% or greater) is required for both the laboratory portion and lecture portion of the course.

For program credit towards the Engineering Certificate, students must achieve an overall average of C+ in all courses with no course grade lower than a C.

Please see the instructor's syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments and use of electronic aids.

EXAM POLICY:

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

COURSE GRADE:

Course grades are assigned as follows:

| Grade | A+ | A | A- | B+ | B | B- | C+ | C | C- | D | F |
|-------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Mark (Percent) | ≥ 90 | 89-85 | 84-80 | 79-76 | 75-72 | 71-68 | 67-64 | 63-60 | 59-55 | 54-50 | < 50 |

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses. For program credit towards the Engineering Certificate, students must achieve an overall average of C+ in all courses with no course grade lower than a C.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

COURSE CHANGES:

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment and marketing needs. The instructor endeavours to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.