ENGG160 – Introduction to Engineering Design, Communication, and Profession
2 credits, 1 hour (in Class Lecture), 2 hours (Online Videos, Reading Materials, Games, Design Project and First Year Nights).

Fundamental design process and theory in a multidisciplinary context. Importance, in engineering design, of communications; teamwork; the engineering disciplines, career fields; professional responsibilities of the engineer including elements of ethics, equity, concepts of sustainable development and environmental stewardship, public and worker safety and health considerations including the context of the Alberta Occupational Health and Safety Act.

Prerequisites and/or co-requisites: ENGL 199

Instructor

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Office Hours

Monday	11:00 - 11:50
Tuesday	12:00 - 13:50
Wednesday	13:00 - 14:50

Hours of Instruction

Tuesday: 18:00 - 18:50, Room S214

Required Resources

MANDATORY TEXT: Designing Engineers: An Introductory Text, ISBN: 978-1-119-12842-7 – S. McCahan, P. Anderson, M. Kortschot, P.E. Weiss, K.A. Woodhouse (Wiley). Available online: https://www.wiley.com/en-ca/search?pq=978-1-119-12842-7%7Crelevance

Recommended (but not mandatory) Text: Introduction to Professional Engineering in Canada 5th ed., ISBN 978-0-13-420448-2 – G.C. Andrews, J.D. Aplevich, R.A. Fraser, C. MacGregor (Pearson). Available online: https://www.vitalsource.com/en-ca/products/introduction-to-professional-engineering-in-gordon-c-andrews-v9780135240137

Course Outcomes

Upon successful completion of the course, the student will be able to:
- Describe the concept and explain the importance of the engineering profession (and history), professionalism in engineering, roles of regulatory bodies (APEGA, Engineers Canada),

professional skills and attitudes of engineers, Engineering Codes of Ethics, sustainability, workplace (AOHSA) and product safety, standards, codes, and regulations, and impact of engineering solutions on environment and society. Demonstrate their knowledge as well as ethical and professional behavior in the term project.

- Describe the concept of Transdisciplinarity and the roles of different disciplines in multi-disciplinary engineering projects.
- Describe the general design process, stages, and design fundamentals and apply them to an open-ended problem in a term project.
- Recall different engineering programs of study offered at the U of A and choose the second-year program of study.
- Describe the general design activities and provide examples of designs and design products form different engineering disciplines. Recognize what components, sub-systems, and systems of various engineering products are and explain the difference between them.
- Name different forms of graphical communication used in different engineering disciplines (piping and instrumental diagrams, process flow diagrams, blueprints, electrical schematics, floor plan, etc.) from real-life.
- Describe the key principles of effective team functioning and demonstrate professionalism, teamwork, and project management skills, while working in teams on a term project.
- Demonstrate communication skills by communicating professionally with teammates and other project stakeholders, solving and/or avoiding conflicts, and by creating proper documentation (project proposal) and a video report of a term project.

Evaluation

Assessment	Weight	Equivalence
First-Year Nights (FYN) Reports (3)	10 Points	30% Homework
Self-Evaluation	4 Points	
Team-Evaluations (3)	12 Points	
Graduate Attribute (GA) Survey-Quiz	4 Points	
Quizzes (10)	20 Points	30% Midterm
EHS Training (WHMIS)	5 Points	
EHS Training (ELO)	5 Points	
Proposal Letter (1/Group)	20 Points	40% Final Exam
Project Video Report (1/Group)	20 Points	
TOTAL	**100 Points**	**100%**

At least 65%, equivalent of grade C, is needed to pass the course. Students shall have multiple attempts on the quizzes.

First-Year Nights (FYN) Reports

In lieu of attendance of a minimum of 2 First-Year Nights, Keyano Engineering Students will submit three FYN Reports. The First FYN report, maximum two pages, will be a write-up on at least three engineering disciplines offered at UofA. The Second FYN Report, minimum two pages, will cover summary of FYN

description and application of an engineering equipment used in Fort McMurray Oil Sand Industries (there is plenty of information on Oil Sands Magazine Website - https://www.oilsandsmagazine.com/).

The Third FYN Report, minimum two pages, will cover summaries of presentations made by speakers following a Webinar or ZOOM Meeting Event where invited New Grad Engineering speakers will have made presentations. As part of the course, students are required to attend one FYN to help them get more information about the field of engineering, engineering programs offered at the University of Alberta, and connect with real-life engineers, professors, and fellow peers. This FYN will be about connecting with real-life engineers (Fresh Graduates) from industry. This will feature New Grad Engineering Presentations covering domains including coping with life at campus (academic and non-academic), choosing and staying in the field of engineering and general workplace aspects.

Self-Evaluation and Team-Evaluations

As part of the course project, each student will complete a self-assessment at the beginning of the course as well as evaluate their project teammates' contributions and performance via a team assessment tool (ITP Metrics). Personal self-assessment will help student to understand their personality constructs, workplace strengths and weaknesses, and preferred learning style. There will be 3 team assessments; these will be open for 1 week and must be completed before the deadline. After each peer evaluation, students will receive anonymous and randomly-ordered scores and comments from their teammates.

Graduate Attribute (GA) Survey

A GA Survey will be given to determine the self-assessed GA levels of students. These include Knowledge base, Problem analysis, Design, Individual & Teamwork, Communication Skills, Engineering tools and Life-long Learning. A final quiz will be provided.

Quizzes

Quizzes shall be conducted online. In total there will be 10 videos and quizzes. Students have multiple attempts at the quizzes, which must be completed individually. Students can complete each quiz as many times as they wish until they score the highest (maximum) score. Quizzes may contain questions from the lectures, textbook and short MOODLE readings, and videos.

EHS Training (WHMIS and CSTS)

As a pre-requisite for second-year courses students must complete the WHMIS and Construction Safety Training System (CSTS) developed by Alberta Construction Association (ACSA). Here is ACSA Website: http://www.youracsa.ca/courses/csts2020/. Students must upload both certificates of completion of each training to receive the full mark for these assignments.

Project Proposal Letter

Students will submit a project proposal letter consisting of planning, customer needs, project goals and objectives. First, students will have to choose their project problem, which will come with background information and a set of the client's general requirements. It will be presented as a mini Request for Proposals (RFP). Using the client's requirements, students will have to develop engineering design requirements, including potential objectives and constraints. They have to summarize their work in a short written proposal (according to the rubric provided). Detailed instructions for each week will be found under MOODLE. Project rubrics will be also available on MOODLE.

Project Video Report

The project video report should be no more than 5 mins, preferably 2 to 3 mins. It must present the visualized solution, explain, and defend its efficiency. The video report should be developed according to the rubric provided. Students are suggested to create a design logbook and take short notes and videos or photos every week to later put them into a video report. It is their responsibility to communicate effectively, manage the time for the project work, negotiate with each other, divide workload, and resolve any conflicts. The instructor will consult about the projects and answer questions on a weekly basis through the Ask Instructor FAQ Forum on MOODLE. Students will be required to work in groups to accomplish this report. However, personal marks will be the same as the team marks to make students really work in teams and communicate, they can manage their own time and assign tasks to follow their team leader. The judging panel will be looking for creativity, relevance, clarity, efficiency, requirements fulfilled and use of design process.

Grading System

Descriptor	Alpha Grade	4.0 Scale	Percent	Rubric for Letter Grades
Excellent	A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
	A	4.0	85 – 92.9	
	A-	3.7	80 – 84.9	
Good	B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
	B	3.0	74 – 76.9	
	B-	2.7	70 – 73.9	
Satisfactory **Progression**	C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
	C	2.0	64 – 66.9	
	C-	1.7	60 – 63.9	
Poor **Minimum Pass**	D+	1.3	55 – 59.9	Work is completed in a general way with minimal support, or is poorly written or did not use proper format.
	D	1.0	50 – 54.9	
Failure	F	0.0	< 50	Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.

Proposed Schedule of Topics

W#	Lecture Topics (1h/Week)	Online Learning (30 Mins/Week)	Project (1h/Week)	Assessment
1	Introduction to the Course, MOODLE, Discussion Forum, Grading & Project.	First-Year Nights (FYN) Schedule, Design & Program Videos, Reading 1 (Introduction to Engineering).	**Self-Evaluation**, Team assignment, Project Weekly Instructions, Topics, and Samples (see MOODLE)	Quiz 1
2	Introduction to Engineering Design	Reading 2a and 2b (Introduction to Communication, Engineering Design), McCahan pages*	Team Meeting, Role Assignment, Topic Selection	Quiz 2 Self-Evaluation Due
3	Planning Stage & Project Management, Problem Definition & Requirements	Read 3 (Introduction to Project Management), McCahan pages*, Research Tools & Project Management Tools	Project Management Decisions, Research, Problem Definition	Quiz 3 FYN Report 1 Due
4	Concept Development Stage 1: Idea Generation	Reading 4 (Introduction to Liability, Risk, DFX, Safety, Standards, Codes, and Regulations), How to use the Standards (Read), McCahan pages*	Concept Generation, Brainstorming, Developing Requirements, **Team-Evaluation 1**	Quiz 4 FYN Report 2 Due
5	Concept Development Stage 2: Idea Selection and Decision-Making Tools	Reading 5 (Introduction to Engineering Ethics), McCahan pages*	Evaluating Ideas and Decision-Making	Quiz 5 Team-Evaluation 1 Due
6	System-Level Design Stage and Detailed Design Stage, Design in Different Disciplines	Reading 6 (Introduction to Transdisciplinarity & Sustainability), McCahan pages*	PROJECT PROPOSAL	Quiz 6 Project Proposal Due
7	Introduction to Graphics & Technical Communication in various Disciplines	PDF Tips on Visual Communication, Sketching and Presentations Online Tips	Visualization of the Proposed Solution, **Team-Evaluation 2**	Quiz 7
8	Implementation & Testing Stage and Production Stage, Design Project End	Introduction to Workplace Safety and AOHSA, EHS Trainings (WHIMS, ELO)	Visualization of the Proposed Solution	Quiz 8 Team-Evaluation 2 Due
9	Real-life Industrial Practice (Video)	Life-Long Learning (Video)	Revision, Refinement, Corrections, Iterations	Quiz 9
10	Guest Lecture – Engineer's Design Thinking	**GA Survey**	Video Production	• Quiz 10 • All Readings, Design & Program Videos And Quizzes Due

11	Faculty Lecture – Choosing Second-year Program, Co-Op, Minors	SECOND-YEAR PROGRAM SELECTION	Video Production	
12	Equity & Diversity in Design		Video Production **Team-Evaluation 3**	Second-Year Program Selection Due
13	Guest Lecture: APEGA		PROJECT VIDEO REPORT	• GA Survey (Quiz) • EHS Training Due • Project Video Report Due • Team-Evaluation 3 Due

Please Note:
Date and time allotted to each topic is subject to change.

Performance Requirements and Student Services

Student Responsibilities
It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar. The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Student Attendance
Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and notes that may be due.

Academic Misconduct
Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own;
- The use of unauthorized aids in assignments or examinations (cheating);
- Collusion or the unauthorized collaboration with others in preparing work;
- The deliberate misrepresentation of qualifications;
- The willful distortion of results or data;
- Substitution in an examination by another person;
- Handing in the same unchanged work as submitted for another assignment; and
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work may not be graded until you show this signed certificate.

Specialized Supports
The Student Services department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano College. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented differently this semester by being provided mostly virtually. In-person service can be requested as needed. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed

accommodations in the past are encouraged to contact us to request them for the semester. Please note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility services supports and to book a virtual appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. Schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing accessibility.services@keyano.ca

Wellness Services: offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. All individual appointments will continue virtually.

Wellness Services welcomes students to participate in any of the virtual group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual virtual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both virtually and in person throughout the semester. For a detailed list of library supports and services, go to www.keyano.ca/library. For any inquiries, please email askthelibrary@keyano.ca.

Begin your research with the Library's FIND page. Search for sources using OneSearch, the Library's Catalogue, or by searching in a specific database selected from the A-Z Database List.

Individual support with the Information Librarian is available virtually. Appointments can be requested by using the Book A Librarian online form.

Research and Subject Guides are helpful resources when beginning your research or addressing other information needs. To view a subject or course specific guide, go to the Subject Guide webpage here.

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the Research Help Library page.

The Loanable Technology collection is available to support students in their online learning pursuits. Items available for borrowing include mobile projectors, webcams, noise cancelling headphones, Chromebooks, and laptops. For an up-to-date list of technology available for borrowing, go to the Library's Loanable Technology webpage.

Skill Centre: Provides academic support services to students registered in credit programs at Keyano College in the form of tutoring, assignment/lab support, writing support groups, facilitated study groups, workshops, and study space. This service is free and is available for all Math, Sciences, Humanities and Trades courses offered at Keyano.

While most courses are being offered online, the Skill Centre will be offering mostly virtual services and in-person sessions as requested. Please email Skill@keyano.ca to get in contact with our Academic Content Specialists. The Skill Centre is located in CC-119 at the Clearwater Campus.

For the most up to date information on how to book a session, please view the Keyano Skill Centre homepage.

Academic Success Coaching: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano. Academic.success@keyano.ca is the best way to access resources during virtual service delivery. The Academic Success Coach is located in the Skill Centre in CC-119 at the Clearwater Campus.

E-Learning

Technology and internet will impact your online learning experience. It's important that you are able to watch an online video and other course materials, take online quizzes, and participant in a live class with your instructor and other students.

Keyano College operates in a Windows based environment and having the correct tools for online learning is important. Here's a list of recommended system requirements.

Internet Speed

Minimum Internet speeds of 5 Mbps.
Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home).
Check your internet speed with Fast.com.

System requirements:

Microsoft Windows	Apple
Minimum Requirements: A Windows 10 **computer/laptop** · Minimum 4GB of RAM. · 10GB+ available hard drive storage. · Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). Microsoft Office software is free to all Keyano students and employees. · Microphone, webcam and speakers. A headset with a microphone is recommended. · System updates must be regularly installed. · Anti-Virus / Anti-Malware software	**Minimum Requirements:** A Macintosh (V10.14 and above) **computer/laptop** · Minimum 4GB of RAM. · 10GB+ available hard drive storage. · Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). Microsoft Office software is free to all Keyano students and employees. · Microphone, webcam and speakers. A headset with a microphone is recommended. · System updates must be regularly installed. · Anti-Virus / Anti-Malware software.
Recommended Requirements · 8GB of RAM · A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free.	**Recommended Requirements** · 8GB of RAM · A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free.

Chromebooks are **not** recommended as they are not compatible with testing lockdown browsers.

A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.

Specific Department Requirements:
Business and OA programs require Windows 10.
Other programs may utilize Windows based tools as well.

Computer Software
Students will be able to get access to Microsoft Office 365 for free using Keyano credentials by clicking here.

Recording of Lectures and Intellectual Property
Students may only record a lecture if explicit permission is provided by the instructor or by Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not share, distribute, or publish any of the lectures or lecture materials, this includes any recordings, slides, instructor notes, etc. on any platform. Thus no student is allowed to share, distribute, publish or sell course related content (instructor, or students) without permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property. The Academic Integrity Policy provides additional information on Keyano College's expectations from students as members of the intellectual community.

ITS Helpdesk
If you are having issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.