

ChE 383 – Chemical Engineering Design Workshop

1 Administrative Information

Instructor: Lena Ahmadi, Ph.D., P.Eng.

Lecture times: Thursdays 2:30-4:20 PM (Will be used for workshops, group and individual meetings)

Note: the course is workshop-based. Most weeks, on Mondays materials will be posted on UWLearn. We will have a short summary and discussions on Thursday if you had any questions, followed by time for you to start on the workshop for that week (During scheduled class time).

Office hours: By appointment, in-person, chat or video calling through MS Teams.

Course Weight: Please note that this is a 0.25 weight course (i.e., half the weight of a typical course).

Course Website: learn.uwaterloo.ca

2 Learning Outcomes

2.1 Intended Learning Outcomes

At the end of this course a successful student should be able to:

1. Describe the engineering design process [1,4]
2. Develop a problem statement and specification for a design problem by performing a needs analysis [4]
3. Identify relevant economic, social, health, safety, legal, and cultural aspects of a design problem [9]
4. Generate and screen potential design solutions using appropriate methods [4]
5. Produce a plan for completion of a significant team project [3,4,5,6,7,11]
6. Work effectively on a team to establish roles and expectations [6]
7. Present a design project proposal in written and oral format [4,7]
8. Accept and provide technical feedback through peer review [4,12]

2.2 Calendar Description

An introduction to the engineering design process, including problem definition and needs analysis, critical analysis of problems, alternative solutions, process synthesis, design constraints, and safety and environmental protection in design. This course also develops and enhances team work, project management and technical communication (written and oral). Students in teams work on open-ended problems and apply the formal methods of engineering design. At the conclusion of this course, each student team presents a pre-proposal of the design project that will become the subject of CHE 482 and CHE 483. [Offered: F, W]

Prereq: 3B Chemical Engineering

3 Grading Scheme

Assignments	40%
Oral presentations	20%
Technical review	10%
Written proposal	30%

- *"We are facing unusual and challenging times. The course outline presents the instructor's intentions for course assessments, their weights, and due dates in fall 2022. As best as possible, we will keep to the specified assessments, weights, and dates. To provide contingency for unforeseen circumstances, the instructor reserves the right to modify course topics and/or assessments and/or weight and/or deadlines with due and fair notice to students. In the event of such challenges, the instructor will work with the Department/Faculty to find reasonable and fair solutions that respect rights and workloads of students, staff, and faculty."*

Notes:

- There are no examinations in this course.
- The written proposal will be due during the final examination period.



Important note: a satisfactory final oral presentation and written proposal is required in order to pass this course, otherwise a grade of incomplete (INC) will be awarded.

4 Schedule

The following tentative schedule is provided. This is subject to adjustment during the term:

Week	Date	Topics	Deliverables	Weight
1	Sep 7-9	Introductory Session		
2	Sep 12-16	Introduction to design, Needs Problem Statement	Sign up for assignment group on Learn and Google link (Wednesday)	0%
3	Sep 19-23	Problem specification		
4	Sep 26-30	Solution generation	Assignment 1 (Thursday)	10%
5	Oct 3-7	Potential solution screening		
-	Oct 10-14	READING WEEK		
6	Oct 17-21	Capstone project Identifications and Impact	Assignment 2 (Thursday)	10%
7	Oct 24-28	Group Meetings	Assignment 3 (Monday)	10%
8	Oct 31-Nov 4	Project Management and Communication		
9	Nov 7-11	Technical Review	Assignment 4 (Monday)	10%
10	Nov 14-18	Group Meetings	Oral Presentation, Pre-recorded: MP4) (Monday)	20%
11	Nov 21-25	Group Meetings	Peer review (Monday)	10%
12	Nov 28- Dec 2	Last day of classes, group meetings		
13	Dec 5-6	(During final exam period)	Written proposal (Thursday)	30%
-	Dec 15			

Deliverables

- Deliverables are always due at 11:59 pm and usually on Thursdays or Mondays (except where indicated otherwise).

5 Privacy and Remote Teaching and Learning: Student Notice of Recording (if needed)

Student Notice of Recording Activities for this course involve recording, in partial fulfillment of the course learning outcomes. You will receive notification of recording via at least one of the following mechanisms: within the Learning Management System (LEARN), a message from your course instructor, course syllabus/website, or other means. Some technologies may also provide a recording indicator. Images, audio, text/chat messaging that have been recorded may be used and/or made available by the University to CHE 383 course students as well as to the coordinator, the instructors and the TAs for the purpose of material review and assessments. Recordings will be managed according to the University records classification scheme, WatClass, and will be securely destroyed when no longer needed by the University. Your personal information is protected in accordance with the Freedom of Information and Protection of Privacy Act, as well as University policies and guidelines and may be subject to disclosure where required by law.

The University will use reasonable means to protect the security and confidentiality of the recorded information, but cannot provide a guarantee of such due to factors beyond the University's control, such as recordings being forwarded, copied, intercepted, circulated, disclosed, or stored without the University's knowledge or permission, or the introduction of malware into computer system which could potentially damage or disrupt the computer, networks, and security settings. The University is not responsible for connectivity/technical difficulties or loss of data associated with your hardware, software or Internet connection.

By engaging in course activities that involve recording, you are consenting to the use of your appearance, image, text/chat messaging, and voice and/or likeness in the manner and under the conditions specified herein. (In the case of a live stream event, if you choose not to have your image or audio recorded, you may disable the audio and video functionality (see: Student privacy during live events). Instructions to participate using a pseudonym instead of your real name are included where the feature exists; however, you must disclose the pseudonym to your instructor in advance in order to facilitate class participation.) If you choose not to be recorded, this notice serves as confirmation of your understanding that you might be requested to view the recording later and/or ask questions in the discussion forum; instructions may be provided elsewhere.

You are not permitted to disclose the link to/URL of an event or an event session recording or copies of recording to anyone, for any reason. Recordings are available only to authorized individuals who have been directly provided the above instructions/link for their use. Recordings for personal use, required to facilitate your learning and preparation of personal course/lecture notes, should not be shared with others without the permission of the instructor or event coordinator. Review the University's guidelines for faculty, staff and students entering relationships with external organizations offering access to

course materials for more information on your obligations with respect to keeping copies of course materials. For more information about accessibility, connect with AccessAbility Services.

Mental Health and Wellness

University can be a rewarding and challenging environment. At times you may feel overwhelmed, stressed, anxious, demotivated, or depressed. Counselling services offers individual, group and peer support counselling, seminars and workshops aimed to facilitate personal and social growth, assist with life difficulties and intervene in times of crisis (<https://uwaterloo.ca/counselling-services/>).

6 Note for Students with Disabilities

AccessAbility Services, located in the Needles Hall extension, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

7 Intellectual Property

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

8 Expectations of Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. More information available at: <http://www.uwaterloo.ca/academicintegrity/>.

Discipline: Academic offences will not be tolerated. Every student is expected to know what constitutes academic integrity to avoid committing an academic offence and to take responsibility for his/her actions. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline:

(<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71>)

For typical penalties, please refer to the Guidelines for the Assessment of Penalties

(<http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines>).

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4

(<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>).

When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Appeals: A decision made or penalty imposed under Policy 70: Student Petitions and Grievances (other than a petition) or Policy 71: Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72: Student Appeals

(<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72>).

9 CEAB Graduate Attributes

The [Canadian Engineering Accreditation Board \(CEAB\)](https://www.engineerscanada.ca/accreditation/accreditation-resources) is responsible for the accreditation of all engineering programs in Canada. An accredited program is one that meets or exceeds the educational standard appropriate for professional accreditation in Canada. One of the requirements for accreditation is to demonstrate that graduates from the program possess a set of twelve “Graduate Attributes”, which are listed below with their CEAB definitions.

1. **A knowledge base for engineering:** Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.
2. **Problem analysis:** An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.
3. **Investigation:** An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information in order to reach valid conclusions.
4. **Design:** An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, economic, environmental, cultural and societal considerations.
5. **Use of engineering tools:** An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.
6. **Individual and team work:** An ability to work effectively as a member and as a leader in teams, preferably in a multi-disciplinary setting.
7. **Communication skills:** An ability to communicate complex engineering concepts within the profession and with society at large. Such abilities include reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.
8. **Professionalism:** An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.
9. **Impact of engineering on society and the environment:** An ability to analyze social and environmental aspects of engineering activities. Such abilities include an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society; the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.
10. **Ethics and equity:** An ability to apply professional ethics, accountability, and equity.
11. **Economics and project management:** An ability to appropriately incorporate economics and business practices including project, risk and change management into the practice of engineering, and to understand their limitations.
12. **Life-long learning:** An ability to identify and to address their own educational needs in a changing world to sufficiently maintain their competence and contribute to the advancement of knowledge.

Source: CEAB, Accreditation Criteria and Procedures Report 2015, ISSN 1708-8054, available at:

<https://www.engineerscanada.ca/accreditation/accreditation-resources>