ENGG*2100 Engineering and Design II

01

Fall 2022
Section(s): C01

School of Engineering
Credit Weight: 0.75
Version 1.00 - September 06, 2022

---

1 Course Details

1.1 Calendar Description

This course is a progression in engineering design skills with particular emphasis on computer usage in design, oral communication of solutions and team skills. Computer usage in design will include advanced CAD/CAM/CAE tools; and database management software. An introduction to safety in engineering practice and design, and the concept of sustainable development are covered.

Pre-Requisites: Completion of 4.00 credits including ENGG*1100

1.2 Course Description

This is the second course in the undergraduate engineering design sequence. The main goals of the courses are to provide experience and guidance for working in and leading teams, developing communication and presentation skills, and teaching design using 3D modeling techniques. Students in this course will work in teams to reverse engineer a small machine, and then use skills learned in this project to then conceive, design, model, simulate, and present a unique solution to a complex design problem.

1.3 Timetable

It is expected that students will have completed the majority of the first year courses and be taking the majority of the semester 3 courses for their engineering program.

Lectures - In person - face to face delivery, ROZ 103

Monday and Wednesday, 11:30 am - 12:20pm

Labs - Face-to-Face Delivery

Lab Attendance is expected for scheduled laboratory activities. Notify your GTA if you will be (or were) absent for any reason. Because the face-to-face labs (THRN 1004, 1006 and 1025) are held simultaneously, your entire section will be expected to attend one or the other lab room based on the lab schedule that will be posted on Courselink.

The course midterm exam is a CAD exam officiated by Solidworks. This 3 hour exam can be completed any time during the scheduled lab day, either in THRN 1004 or elsewhere virtually.

You MUST attend your assigned lab section only. Schedule (by section):

		Face-to-Face (THRN 1004 and THRN 1025)
Section 1		Wednesday, 8:30 - 11:20 am
Section 3		Tuesday, 8:30 - 11:20 am
Section 4		Thursday, 8:30 - 11:20 am
Section 5		Wednesday, 2:30 - 5:20 pm

Seminars - In Person Delivery

Each student will attend and give one seminar (PowerPoint Presentation) during the semester. The seminars will be given in THRN 1002 or 1006, during your scheduled seminar time throughout the course. You will be assigned a week and time slot based on alphabetical order and this information will be posted on Courselink.

General Note:

The expectation is that an average student requires about 15 hours per week to get a 'B' grade in this course. These 15 hours include the 6 hours of scheduled class time (2 hrs lecture, 3 hrs lab & 1 hr seminar) per week.

1.4 Final Exam

The final exam is currently scheduled for December 5th, 2022, 8:30 - 10:30 am. Note that this exam time is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor: John Runciman MaSc, PhD, PEng
Email: jruncima@uoguelph.ca
Office: THRN 2406

Lab Co-ordinator: Ahmed Mezil
Email: amezil@uoguelph.ca
Telephone: +1-519-824-4120 x53729
Office: THRN 2308

Lab Technician: David Wright
Email: dwrigh02@uoguelph.ca
Telephone: +1-519-824-4120 x56706
Office: THRN 1023

Lab Technician: Ken Graham
Email: kgraha06@uoguelph.ca
Telephone: +1-519-824-4120 x53924
Office: THRN 1021

Library Support: Jacqueline Kreller-Vanderkooy
Email: jkreller@uoguelph.ca
Telephone: +1-519-824-4120 x54539
Office: LIB 277

2.2 Teaching Assistants

Teaching Assistant (GTA): Jay McNeill
Email: jmcnei01@uoguelph.ca
Office Hours: please use scheduled laboratory time slots.

Teaching Assistant (GTA): Matthew Drummond
Email: mdrumm02@uoguelph.ca
Office Hours: please use scheduled laboratory time slots.

Teaching Assistant (GTA): Peter Zytner
Email: pzytner@uoguelph.ca
Office Hours: please use scheduled laboratory time slots.

Teaching Assistant (GTA): Trung Le
Email: tle20@uoguelph.ca
Office Hours: please use scheduled laboratory time slots.

Teaching Assistant (GTA): Dhruvin Dankhara
Email: ddankhar@uoguelph.ca

3 Learning Resources

3.1 Required Resources

CourseLink (Website)

https://courselink.uoguelph.ca/

Course material, news, announcements, and grades will be regularly posted to the ENGG*2100 Courselink site. You are responsible for checking the site regularly.

Please use lectures and lab help sessions as your main opportunity to ask questions about the course. Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

3.2 Other Resources

Lecture Information: Lectures will be delivered face-to-face.

Lab Information: Teaching Assistants will be available in lab periods to direct activities and answer questions. The Teaching Assistants will provide resources regarding tutorials and links to related web pages. See Courselink for detailed information regarding which face-to-face labs (THRN 1004 and/or THRN 1006 & 1025) you are expected to attend throughout the semester.

---

4 Learning Outcomes

This is the second course in the undergraduate engineering design sequence. The main goals of the courses are to provide experience and guidance for working in and leading teams, developing communication and presentation skills, and teaching design using 3-D modelling techniques. Students in this course will work in teams to reverse engineer a common object such as a lawn mower, and then use skills learned in this project to then conceive, design, build, test and present a unique solution to a complex design problem.

4.1 Course Learning Outcomes

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

1. Develop and deliver an oral presentation on an engineering topic of interest
2. Work within a team to reverse engineer a complex structure
3. Work within a team to solve a complex problem
4. Conceptualize physical solutions to a complex problem
5. Develop, design. build, test and demonstrate a novel design solution for a complex problem

6. Generate an engineering design report
7. Identify various manufacturing strategies and their characteristics.
8. Evaluate safety issues related to design.
9. Discuss issues related to sustainability and ethics as they relate to design.
10. Demonstrate competency with standard computer aided design modelling techniques

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
4	Design	4, 5, 7
4.2	Construct design-specific problem statements including the definition of criteria and constraints	4
4.3	Create a variety of engineering design solutions	4, 7
4.4	Evaluate alternative design solutions based on problem definition	4
4.5	Develop and refine an engineering design solution, through techniques such as iteration, simulation and/or prototyping	5
5	Use of Engineering Tools	2, 10
5.2	Demonstrate proficiency in the application of selected engineering tools	2, 10
6	Individual & Teamwork	3
6.2	Understand all members' roles and responsibilities within a team	3
6.3	Execute and adapt individual role to promote team success through, for example, timeliness, respect, positive attitude	3
6.5	Demonstrate leadership through, for example, influencing team vision and process, promoting a positive team culture, and inspiring team members to excel	3
7	Communication Skills	1, 6
7.1	Identify key message(s) and intended audience in verbal or written communication as both sender and receiver	1
7.2	Interpret technical documentation such as device specification sheets, drawings, diagrams, flowcharts, and pseudocode	6
7.3	Construct the finished elements using accepted norms in English, graphical	6

#	Outcome	Learning Outcome
	standards, and engineering conventions, as appropriate for the message and audience	
7.4	Substantiate claims by building evidence-based arguments and integrating effective figures, tables, equations, and/or references	6
8	Professionalism	8
8.1	Demonstrate an understanding of what it means to be a professional engineer and distinguish between legislated and non-legislated professions	8
9	Impact of Engineering on Society and the Environment	8, 9
9.1	Analyze the safety, social, environmental, and legal aspects of engineering activity	8, 9
11	Economics and Project Management	6
11.1	Apply project management techniques and manage resources within identified constraints	6

5 Teaching and Learning Activities

5.1 Lecture

Lecture 01
Topics: Introduction to Course and Seminar Administration
Learning Outcome: 1

Lecture 02
Topics: Design and Engineering
Learning Outcome: 4

Lecture 03
Topics: "Total Design"
Learning Outcome: 4

Lecture 04
Topics: Tools of Engineering Design
Learning Outcome: 2, 4

Lecture 05
Topics: Teamwork - basics
Learning Outcome: 2, 3

Lecture 06

Topics: Teamwork - strategies for dealing with people
Learning Outcome: 2, 3

Lecture 07
Topics: Teamwork - group dynamics
Learning Outcome: 2, 3

Lecture 08

Topics: Drawing and Tolerancing

Learning Outcome: 7

Lecture 09
Topics: Brainstorming
Learning Outcome: 3, 4

Lecture 10
Topics: Brainstorming - by design
Learning Outcome: 3, 4

Lecture 11
Topics: Meetings
Learning Outcome: 2, 3

Lecture 12
Topics: Meeting - Chairing
Learning Outcome: 2, 3

Lecture 13
Topics: Creative Design, Concept Development
Learning Outcome: 4

Lecture 14
Topics: Creative Design, Case Studies
Learning Outcome: 4

Lecture 15
Topics: Design Ergonomics - communicationg through your design
Learning Outcome: 4, 8

Lecture 16
Topics: Design Ergonomics - case studies
Learning Outcome: 4, 8

Lecture 17
Topics: Manufacturing
Learning Outcome: 7

Lecture 18
Topics: Polymer Manufaturing
Learning Outcome: 7

Lecture 19

Topics: Quality Assurance
Learning Outcome: 7

Lecture 20
Topics: International, National and Local Standards and Guidelines
Learning Outcome: 8, 9

Lecture 21
Topics: Sustainable and Ethics
Learning Outcome: 8, 9

Lecture 22
Topics: Safety
Learning Outcome: 8, 9

Lecture 23
Topics: Guest lectures, TBA

Lecture 24

Topics: Course Review

5.2 Seminar

Sept 12 - 16
Topics: No Seminars Scheduled this week.

Sept 19 - 23

Topics: No seminars scheduled this week

Sept 26 - 30
Topics: Individual presentations

Oct 3 - 7
Topics: Individual presentations

Oct 12 - 18

Topics: Individual presentations

Oct 19 - 25

Topics: No Seminars scheduled this week

Oct 16 - Nov 1

Topics: Individual presentations

Nov 2 - 8

Topics: Individual presentations

Nov 9 - 15

Topics: Individual presentations

Nov 16 - 22

Topics: Individual presentations

5.3 Lab Schedule

Week	THRN 1004	Hands-On	Deliverables
1, Sept. 12 - 16	CAD Tutorial #1	Reverse Engineering, THRN 1025	
2, Sept 19 - 23	CAD Tutorial #2	Reverse Engineering, THRN 1025	
3, Sept 26 - 30	CAD Tutorial #3	Reverse Engineering, THRN 1025 & 1006	Mastery Check
4, Oct 3 - 7	CAD Tutorial #4	Reverse Engineering, THRN 1025 & 1006	Mastery Check
Oct 8 - 11	No Labs - Fall Break	No Labs - Fall Break	
5, Oct 12 - 18	CAD Tutorial #5	Reverse Engineering, THRN 1025 & 1006	2-d drawings
6, Oct 19 - 25	-	-	Cad Exam
7, Oct 26 - Nov 1	Design Project	Design Project, THRN 1006 (1025)	Animation & Concept Sketches
8, Nov 2 - 8	Project Coaching	Design Project, THRN 1006 (1025)	Proof of Concept
9, Nov 9 - 15	Project Coaching	Design Project, THRN 1006 (1025)	Design Proposal

10, Nov 16 - 22	Project Coaching	Design Project, THRN 1006 (1025)	
11, Nov 23 - 29	-	-	Design Presentations, Demonstration and Evaluation, THRN 1006
Dec 1	-	-	Design Report & Peer Assessment

6 Assessments

6.1 Assessment Details

Individual Presentation, with the use of aids (10%)
Date: Scheduled in the seminar sections Sept 26 - Nov 22, THRN 1002 & 1006
Learning Outcome: 1

Reverse Engineering Exercise (20%)
Date: Scheduled in the first half of the course, see table for details, THRN 1004 (1025 & 1006)
Learning Outcome: 2, 3, 10

Mastery Check 1	**Sept 26 - 30**	(individual assignment)	1%
Mastery Check 2	**Oct 3 - 7**		1%
2-d Drawings	**Oct 12 - 18**	(individual assignment)	10%
Animation	**Oct 26 - Nov 1**	(group assessment)	8%

CAD Midterm (10%)
Date: Week of October 19 - 25, Virtual
Learning Outcome: 10
Scheduled during lab sections.

Design and Build project (40%)
Date: scheduled in the second half of the course, Presentations in THRN 1006, submissions in-person and on-line
Learning Outcome: 3, 4, 5, 6

Concept Sketches	**Oct 26 - Nov 1**	(group assessment)	3%
Proof of Concept	**Nov 2 - 8**	(group assessment)	2%
Design Proposal	**Nov 9 - 15**	(group assessment)	5%
Design Presentation, Demo & Evaluation	**Nov 23 - 29**	(group assessment)	15%

Final Report	**Dec 1**	(group assessment)	10%
Peer Assessment	**Dec 1**	(individual assessment)	5%

Final Exam (20%)
Date: Mon, Dec 5, 8:30 AM - , 10:30 AM, TBD
Learning Outcome: 6, 8, 9

---

7 Course Statements

7.1 Grading Policies

Missed Assessments: If you are unable to meet any in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor or GTA responsible for the individual assessment that is affected. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Midterm Grading: If you miss the Midterm you will be assessed a mark of 0 for the exam.

Passing Grade: In order to pass the course, you must achieve a combined mark (all aspects of the course) of 50% or above. You must also pass both the Final Exam and the Design and Build Project portions of the course. 50% is considered a passing grade. A failing grade (below 50%) for the entire course, or the Final Exam or the Design and Build Project will mean that you have failed the course. The assigned grade will be your lowest of these grades.

Late Submissions: Late submissions will not be accepted.

Grading Philosophy: The grading philosophy used for this course will recognize that design has a significant artistic component and is not a right or wrong situation. Thus, we will start with a perspective that your work is assumed to be a “B” until there is evidence within that work that is impressive or aspects that are disappointing. Impressive and disappointing components are integrated to leave a final assessment.

Group Assessment: Team-based activities form a major proportion of the course. Teams will

be asked to evaluate individual team member participation. Evidence of lack of participation by individuals will result in a modified grade assessment for those students.

Final Exam: The Final Exam will be used to assess your understanding of primarily the lecture material. The Final Exam will be closed book with no electronic aids permitted.

7.2 Laboratory / Machine Shop Safety

Many laboratory sessions will be held in the School's machine shop. The following safety principles apply to all sessions and to all students:

1. Ken Graham and Dave Wright have full authority for all aspects of our time in THRN 1025
2. There will be a maximum of 25 students in the shop at any point in time and this number can only be supported when both Ken or Dave and a GTA are present
3. You will NOT be able to attend any lab session other than the one assigned to your lab section of the course
4. You will be required to show respect for Ken, Dave, your GTA and shop equipment
5. You will be required to dress appropriately
6. No open toed shoes
7. No loose clothing
8. Safety glasses are to be worn
9. Shop coats are recommended and are available in the shop for your use
10. If you do not know how to use shop equipment - ASK
11. THINK first.
12. Additional rules will be posted in the shop or expressed by Ken or Dave.
13. Failure to safely work in the shop may lead to lost shop privileges. This is likely to have academic consequences.

8 School of Engineering Statements

8.1 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and labs.

8.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

8.3 Lab Safety

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
https://www.uoguelph.ca/sas

For Ridgetown students, information can be found on the Ridgetown SAS website
https://www.ridgetownc.com/services/accessibilityservices.cfm

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not

relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars

9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

9.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
- https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
