ENGG*1100 Engineering & Design I
Fall 2018

School of Engineering

(September 6, 2018)

---

1 INSTRUCTIONAL SUPPORT

1.1 Instructors

Instructor:	John Donald, Ph.D., P.Eng.	Email:	jrdonald@uoguelph.ca
Office:	RICH 2503, ext. 53084	Office hours:	By appointment
Instructor:	Erica Pensini, Ph.D., P.Eng.	Email:	epensini@uoguelph.ca
Office:	RICH 2525, ext. 56746	Office hours:	By appointment
Lab Support:	Cameron Farrow, Ph.D., E.I.T.	Email:	cfarrow@uoguelph.ca
Office:	RICH 1515, ext. 53838	Office hours:	By appointment

1.2 Technician

Technician:	Alex Galvez	Email:	agalvez@uoguelph.ca
Office:	THRN 2363, ext. 53663		

1.3 Teaching Assistants

Lab Section(s)	Name	Email	Office Hours
0101	Andrew MacKey	mackeya@uoguelph.ca	During Lab
0101	Daniel Brito	dbrito@uoguelph.ca	During Lab
0102	Kimberly Swain	kswain@uoguelph.ca	During Lab
0102	Graham Pitfield	gpitfiel@uoguelph.ca	During Lab
0103, 0104	Ryan Byerlay	rbyerlay@uoguelph.ca	During Lab
0103, 0104	Ragul Raj Vaiyapuri Ramesh Khumar	rvaiyapu@uoguelph.ca	During Lab
0105, 0106	Wenyu Han	whan01@uoguelph.ca	During Lab
0105, 0106	Sachet Siwakoti	ssiwakot@uoguelph.ca	During Lab
0107, 0108	Katherine McLeod	kmcleo04@uoguelph.ca	During Lab
0107, 0108	Harrison Brodie	hbrodie@uoguelph.ca	During Lab

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements will be regularly posted to the ENGG*1100 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

1. Ewald, Thorsten, *Writing in the Technical Fields: A Practical Guide*, 2nd Edition, Oxford University Press, 2017.
2. Log Book and Sketch pad.
3. I<clickers for quizzes.

2.3 Recommended Resources

1. Andrews G.C., Aplevich J.D., MacGregor C., Fraser R.A., *Introduction to Professional Engineering in Canada*, 5th Edition, Prentice Hall, 2017.

2.4 Additional Resources

Lecture Information: Lecture material will be posted on Courselink. These notes are meant to supplement lectures, and are not complete on their own.

Lab Information: Information related to the lab sessions such as handouts and links to web pages will be posted on Courselink.

Assignments & Project Information: Will be posted on the Courselink site.

Miscellaneous Information: Other information related to the course will be posted on Courselink.

2.5 Communication & Email Policy:

Please use lectures and lab sessions as your main opportunity to ask questions about the course.

- Major announcements will be posted to Courselink.
- **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.
- E-mails to course instructors and GTA's should have ENGG*1100 in the subject line.

3 ASSESSMENT

3.1 Dates and Distribution

Item (Individual or Team)	Grade	Date(s)
Final Exam (Individual)	20%	Monday, December 3rd, 2:30 pm – 4:30pm
Design Project (Team) ….Prototype Testing (5%) Performance (15%) Final Report (25%)	45%	Prototype testing • THRN 1435 Labs - Oct. 22nd to 26th. • Interim Report due 2 days after Lab (6:00 pm) Performance - THRN 1435 Labs - Nov. 20th to 24th. • TBWC Events Final Report • Aesthetics - due Sat Nov 10th (6:00 pm) • Appendix - due 2 days prior to Performance (6:00 pm) • Main Body due 2 days after Performance (6:00 pm)
Design Project (Individual) …Self & Peer Review 1 (2%) …Self & Peer Review 2 (3%)	5%	Self & Peer Review 1 • 4 days after Prototype Testing (6 pm) Self & Peer Review 2 • 4 days after Performance (6 pm)
Lab Quizzes (5, Individual)	14%	In THRN 1319 or THRN 1435 Lab -- Weeks 2,4,6, 8 &10
Clicker Quizzes (best 6 of 8, Individual)	5%	Approximately once per week in Lectures
Log Book Checks (Individual) #	3%	THRN1435 Lab -- Weeks 3, 6 10
Stewardship Assignment – Photo Essay (Individual)	3%	Due Sat Oct 13th, 6:00pm
Innovation Assignment - Idea Communication (Individual)	5%	Due Sat Nov 3rd, 6:00pm
SOE Safety Quiz - Student Green Card (Individual)	P/F	Failure to pass the SOE Safety Quiz to obtain your Student Green Card will result in an **Incomplete** grade for the entire course.

#Note: Log books have significance beyond this 3% for individuals who are not equal contributors to their teams. See note in Section 3.2 on team work.

3.2 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. 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 at 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

Passing Grade: The passing grade for this course is 50%.

Lab Work: You are expected to attend and participate in all laboratories. You may only attend your scheduled section. Professor Donald's permission is required for you to attend an alternate. If you complete an assessment in an alternate section without Professor Donald's permission then your assessment will not count.

Missed items: There will be no makeup for missed individual in-lab quizzes. If you are granted academic consideration (medical or compassionate) or religious accommodation, the weight of the missed item will be added to the corresponding in-lab quiz items.

Late: Late submissions will not be accepted.

Certification: Students must write their PEO SMP (Student Membership Program) number on all submitted work. This signifies that the SOE Code of Ethics was adhered to.

Team Work: If there is some observation or evidence that you have not been an approximately equal contributor to your team's work then you will be asked to provide evidence of your individual efforts, contributions and results. A logbook is a required means to help demonstrate your contributions. Low contributions may lead to a lower grade than the "team grade" or, in more extreme cases, academic misconduct policies being applied. Log Book and/or other indicators such as self & peer assessments may trigger meetings with individuals and/or teams regarding contributions.

Student Green Card: If no members of your design team hold a student green card then your team will not be able to use the student project storage space or the student shop space. You will need to meet these needs on your own. Failure to pass the SOE Safety Quiz to obtain your Student Green Card will result in an Incomplete grade for the entire course.

---

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

Introduction to engineering and design by means of selected problems. Students integrate basic science, mathematics, and complementary studies to develop and communicate engineering solutions to specific needs using graphical, oral, and written means. Application of computer-aided drafting, spreadsheets, and other tools to simple engineering design problems. The practice of professional engineering and the role of ethics in engineering.

Restriction: Registration in the B.Eng. Program

4.2 Course Aims

The aim of the course is an introduction to engineering design and to Guelph's sequence of design courses, an introduction to expectations of the profession in spirit and specifics, to establish a collaborative and team philosophy around learning and engineering, and to stimulate enthusiasm through the successful completion of a design challenge. Finally to initiate the development of independent learning skills that are essential for success in engineering education and engineering careers.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. ***Describe*** *a systematic engineering design process.*
2. ***Design*** *a solution to a defined engineering problem relying on high school background and first year engineering principles*

   a. ***Demonstrate*** *command of constraints and criteria.*
   b. ***Integrate*** *simple engineering analysis to defend and advance your design.*
3. ***Produce*** *engineering design documentation in written, oral and graphical (visual) forms with an emphasis on the graphical.*
   a. *Prepare engineering drawings of design ideas and across engineering disciplines*
   b. *Explain engineering drawings across engineering disciplines*
4. ***Construct*** *solutions with the aid of engineering tools (e.g. CAD, spreadsheet, computer programming and hand tools).*
5. ***Describe*** *overall professional engineering responsibilities with particular emphasis in terms of ethics and safety.*
6. ***Analyze*** *existing and historical engineering designs.*
7. ***Practice*** *individual and team work and project management necessary for learning and project completion on time.*

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning Objectives	Assessment
1. Knowledge Base for Engineering		
2. Problem Analysis		
3. Investigation		
4. Design	1, 2, 3	Exam, Assignments, Project, Reports, Quizzes
5. Use of Engineering Tools	4	Exam, Assignments, Project, Reports, Quizzes
6. Individual and Teamwork	3,7	Assignments, Project, Reports, Quizzes
7. Communication	3	Exam, Assignments, Project, Reports, Quizzes
8. Professionalism	5, 6	Exam
9. Impact of Engineering on Society and the Environment	5, 6	Exam, Assignments, Reports, Quizzes
10. Ethics and Equity	5, 6	Exam
11. Economics & Project Management	7	Exam
12. Life-Long Learning		

4.5 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/D2L but these are not intended to be stand-alone course notes. 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 project.

4.6 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. 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. The University Academic Calendar http://www.uoguelph.ca/registrar/calendars/index.cfm?index and School Program guides https://www.uoguelph.ca/engineering/content/resources/guides are both essential resources.

Students will be working in teams and in a collaborative learning environment. You are responsible to be an active contributor to your teams. You are responsible to maintain a personal logbook that documents your teamwork. Courselink provides an overview of the expected use and content of your logbook.

4.7 Relationships with other Courses & Labs

Con-Current Courses:

CIS*1500: Programming the Arduino Microcontroller complements your programming course.
HIST*1250: Some engineering cases complement an historical look at technology and society.

Follow-on Courses:

ENGG*2100, 3100, 41x0: Engineering & Design II, III & IV
ENGG*3/4XX: Each engineering program has at least 3 additional design courses.
ENGG*XXXX: A very large fraction of your program will encourage and/or rely on collaborative, team learning approaches.

Concurrent Pedagogical Research: Students in this course will be invited to participate in an "Engineering Team Dynamics" research study about the impact of team dynamics and social interactions on students' academic trajectories early in their engineering education. This research will advance understanding of barriers to undergraduate's long-term engagement and academic success in STEM, so participants will be asked to release their academic records for this research. Participation is voluntary and should take less than 45 minutes (total); choosing not to participate will not impact your relationship with the University of Guelph or your course standing in any way. This study has been reviewed and received clearance through research ethics committees at the Universities of Guelph and Waterloo.

5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures (All sections):
Wednesday 7:00 – 8:50 p.m. ROZH 104

Labs (You may only attend your scheduled lab sections):

Section	Computer Lab (THRN 1319)	Design Lab (THRN 1435)
0101	Monday 9:30 – 11:20 am	Wednesday 9:30 – 11:20 am
0102	Wednesday 9:30 – 11:20 am	Monday 9:30 – 11:20 am
0103	Tuesday 9:30 – 11:20 am	Thursday 9:30 – 11:20 am
0104	Thursday 9:30 – 11:20 am	Tuesday 9:30 – 11:20 am
0105	Monday 3:30 – 5:20 pm	Wednesday 3:30 – 5:20 pm
0106	Wednesday 3:30 – 5:20 pm	Monday 3:30 – 5:20 pm
0107	Wednesday 1:30 – 3:20 pm	Friday 1:30 – 3:20 pm
0108	Friday 1:30 – 3:20 pm	Wednesday 1:30 – 3:20 pm

Lab Start Dates: The Design and Computer labs will start on Monday September 10th and end on Friday November 30th resulting in 11 sessions for each section in each lab.

Dates with no Labs: There are no labs on Thursday September 6th, Friday September 7th, Monday October 8th (Thanksgiving), Tuesday October 9th (Fall Study Break Day), Wednesday October 10th, Thursday October 11th, or Friday October 12th.

Additional Note:

The course carries a 0.75 credit weight. A typical "B" student is expected to require approximately 15 hours per week to receive a "B" grade in a course with this weighting. This 15 hours includes the 6 hours per week of scheduled contact hours (2 hours in lecture and 4 hours in labs).

5.2 Lecture Schedule (approximate, subject to shift at the discretion of instructors)

Lectures	Lecture Topics	Learning Objectives
Week 1	Course Overview and Introduction to Engineering	5
Week 2	Engineering Communication, Teams, Project Management	3, 5, 7
Week 3	Engineering Design Process & Communication	1, 2, 3, 6
Week 4	Engineering Design Process & Communication	1, 2, 3, 6
Week 5	Professional Engineering and Practice	5, 6
Week 6	Engineering Communication: Graphics, Report, Reflection	3, 7
Week 7	Sustainable Design	5, 6
Week 8	Engineering Ethics	5, 6
Week 9	Design for Safety	5, 6
Week 10	Special Topic in Engineering Design	5, 6
Week 11	The 21st Century Engineer	5, 6
Week 12	Course Wrap Up	5

5.3 Design & Computer Lab Approximate Schedule

Week	Dates	Computer Lab (THRN 1319)	Design Lab (THRN 1435)
1	Sept 10 – 14	Introduction to Computers, SolidWorks 1	Team & Design Exercises
2	Sept 17 – 21	SolidWorks 2, Arduino 1	Sketch 1 – Perspective
3	Sept 24 – 28	SolidWorks 3	Design Project Launch, Team forming
4	Oct 1 – 5	Arduino2, Motor Circuit	Sketch 2 – Orthographic Projection, Spreadsheets
5	Oct 8-12	NO LABS	NO LABS
6	Oct 15 – 19	Lab Quiz 1 (SolidWorks), AutoCAD 1	Ideas Exercises, Safety Exercise
7	Oct 22 – Oct 26	AutoCAD 2	Measurement, Criteria Exercise
8	Oct 29 – Nov 2	Lab Quiz 2 (Spreadsheets)	Life Cycle Exercise
9	Nov 5 – 9	AutoCAD 3	
10	Nov 12 – 16	Lab Quiz 2 (AutoCAD), AutoCAD 4	Aesthetics Assessment
11	Nov 19 – 23	Design Project	Design Project Performance
12	Nov 26 – 30	Project Wrap Up	Project Wrap Up

Note: No labs on Sept. 6th & 7th, Oct. 9th to Oct. 12th.

5.4 Other Important Dates

Monday, October 8th - Thanksgiving holiday, no classes
Tuesday, October 9th - Fall Study Break Day, no classes
Friday, November 2nd - 40th class day – last day to drop one-semester courses
Thursday, November 29th - Tuesday Schedule in effect. Make up for Fall Study Break Day
Friday, November 30th - Monday Schedule in effect. Make up for Thanksgiving

6 LAB SAFETY

6.1 School of Engineering Policy

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.

6.2 ENGG*1100 Specific

The computer labs are largely limited to computer use only. A few computer labs will work with an Arduino Microcontroller, DC batteries and small electrical motors. The computer connection to the Arduino is via the USB port. There are no significant safety issues introduced.

One of the capacitors used in the project is polarized and will explode (pop) if connected backwards or shorted. You are required to wear safety glasses in the computer lab when we are first working with this.

You are required to provide a simple paper or cardboard enclosure for this item in your design. It is recommended that you wear safety glasses when working with this capacitor.

In the design labs, you will be using Meccano (suitable for ages 8+), Arduino Microcontroller (suitable for teenager+ ages), wrenches, screwdrivers, wire strippers, DC batteries and other similar small hobby, low risk tools and components.

The student shop space is available for your project work and for project storage. Two teams will share one project storage cage. You are required to have a "Student Green Card" to access and use the project storage space and to use the student shop space. To obtain your Student Green Card you must review the online lecture and supporting material in the Courselink Course "SOE Machine Shop" and pass the Green Card Safety Quiz that accompanies the "SOE Machine Shop" course.

Requirements for Student Shop Usage

- Safety glasses on at **ALL** times.
- Leave the space as clean as or cleaner than when you arrived.
- Do not let other students in – if they have access permission their card works at the door.
- Do not work alone.

Working mobile storage units & mobile stairs

- Check that the space is clear between mobile storage units.
- Press stop on the units.
- Press the Move button on the unit you wish to move
- Accessing your storage unit
    - Do not leave your unit's doors open even if you are working a few feet away.
- Accessing units using mobile stairs
    - If you have a unit on higher rows (3rd and 4th) use the mobile stairs to safely access unit.
    - The mobile stairs have two levers:
        - One to engage the wheels so that the stairs roll freely.
        - One to disengage the wheels so that it is safe to climb the stairs without it rolling.

      DO NOT CLIMB THE STAIRS IF THE WHEELS ARE ENGAGED.
- **WATCH YOUR HEAD FOR OPEN DOORS ON THE 3RD OR 4TH LEVEL OF THE STORAGE SYSTEM.**

7 ACADEMIC MISCONDUCT

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 discourages misconduct. 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.

7.1 Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:
http://www.academicintegrity.uoguelph.ca/

Please also review the section on Academic Misconduct in your Engineering Program Guide.

The School of Engineering has adopted a Code of Ethics that can be found at:
https://www.uoguelph.ca/engineering/content/resources/code

7.2 ENGG*1100 Specifics

ENGG*1100 requires a combination of individual and teamwork to successfully complete this course. Collaborative learning will be encouraged throughout. It will be clearly stated when an assessment is to be an individual exercise, when it is a team exercise and when it is wide open for collaborative work.

In the event there is some reason to believe that you are not or have not fairly contributed to the work of your team then you will be required to submit your Log Book to aid judgment regarding adjustment of "team" grade for project and/or for academic misconduct.

7.3 The Use of Turnitin

This course uses Turnitin (integrated with the CourseLink Dropbox tool) to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph. Submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students can educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.

8 ACCESSIBILITY:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible. For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/ .

9 RECORDING OF MATERIALS

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

10 RESOURCES

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:
http://www.uoguelph.ca/registrar/calendars/index.cfm?index