ENGG*1100 Engineering & Design I
Fall 2016

School of Engineering

(September 8, 2016)

1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: John Donald, Ph.D., P.Eng. Email: jrdonald@uoguelph.ca
Office: RICH 2503, ext. 53084 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	Name	Email	Office Hours
0101	Yvonne Post	ypost@uoguelph.ca	During Lab
0102	Ramneek Kang	rkang@uoguelph.ca	During Lab
0103	Alexander Nolan	nolana@mail.uoguelph.ca	During Lab
0104	Cameron Farrow	cfarrow@uoguelph.ca	During Lab
0105	Peter Innes	pinnes@uoguelph.ca	During Lab
0106	Gurvinder Mundi	gmundi@uoguelph.ca	During Lab
	Yvonne Post	ypost@uoguelph.ca	During Lab
0107	Hayson Ko	cko@mail.uoguelph.ca	During Lab
0108	Abdulmonem Murayyan	amurayya@uoguelph.ca	During Lab
0109	Ryan Good	rgood@uoguelph.ca	During Lab
0110	Terrance Devries	terrance@uoguelph.ca	During Lab
0111	Caryn Vowles	cvowles@mail.uoguelph.ca	During Lab
0112	Gurvinder Mundi	gmundi@uoguelph.ca	During Lab
0113	Bryan Piper	bpiper@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. Andrews G.C., Aplevich J.D., MacGregor C., Fraser R.A., *Introduction to Professional Engineering in Canada,* 4th Edition, Prentice Hall, 2015.
2. Log Book and Sketch pad.

2.3 Recommended Resources

None.

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: This 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 should have ENGG*1100 in the subject line.

3 ASSESSMENT

3.1 Dates and Distribution

Item	Grade	Date(s)
Final Exam (Individual)	20%	Wednesday, December 7th, 7:00 pm – 9:00pm
Design Project (Team) Performance (20%) Final Report (25%)	45%	Visual due Sat Nov 12th Performance in THRN 1435 Lab Time from Nov 23th to 30th. Appendix Portion of Final Report due 2 days prior to Performance Lab (6:00 pm) Main Body Portion of Final Report due 2 days after Performance Lab (6:00 pm)
Lab Quizzes (3, Individual)	12%	In THRN 2313 Lab -- Weeks 3, 7 & 10
In Lab Assignments for Design and Visual process development (Mix)	15%	Some Pass / Fail and some Graded Approx. 15 in total and equally weighted Majority assigned and completed in Lab
Log Book Checks (Individual) #	3%	In THRN1435 Lab -- Weeks 3, 6 & 10
Innovation Project - Idea Communication (Individual)	5% + Bonus	Due Sat Nov 5th, 6:00pm Bonus assessed by peers in THRN2313 Lab Wk 11

# 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 assignments or 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 parallel 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 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.

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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, In Lab Assignments, Design Project
5. Use of Engineering Tools	4	Exam, In Lab Assignments, Design Project, Visual Communication
6. Individual and Teamwork	3,7	In Lab Assignments, Design Project, Visual Communication
7. Communication	7	Exam, In Lab Assignments, Design Project Documentation, Visual Communication
8. Professionalism	5, 6	Exam
9. Impact of Engineering on Society and the Environment	5, 6	Exam, Design Documentation
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 http://www.uoguelph.ca/engineering/Engineering_Program_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

Previous Courses:

Hopefully all of your previous education proves valuable.

Con-Current Courses:

ENGG*1210: Design project will rely on Physics (high school) and mechanics.
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.

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5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures (All sections):

Monday	12:30 - 1:20 p.m.	War Memorial 103
Wednesday	12:30 - 1:20 p.m.	War Memorial 103

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

Section	Computer Lab (THRN 2313)	Design Lab (THRN 1435)
0101	Monday 10:30 – 12:20 pm	Wednesday 10:30 – 12:20 pm
0102	Wednesday 10:30 – 12:20 pm	Monday 10:30 – 12:20 pm
0103	Monday 3:30 – 5:20 pm	Friday 3:30 – 5:20 pm
0104	Friday 3:30 – 5:20 pm	Monday 3:30 – 5:20 pm
0105	Friday 1:30 – 3:20 pm	Wednesday 1:30 – 3:20 pm
0106	Wednesday 1:30 – 3:20 pm	Friday 1:30 – 3:20 pm
0107	Tuesday 1:30 – 3:20 pm	Thursday 1:30 – 3:20 pm
0108	Thursday 1:30 – 3:20 pm	Tuesday 1:30 – 3:20 pm
0109	Tuesday 3:30 – 5:20 pm	Thursday 3:30 – 5:20 pm
0110	Thursday 3:30 – 5:20 pm	Tuesday 3:30 – 5:20 pm
0111	Tuesday 8:30 – 10:20 pm	Thursday 8:30 – 10:20 pm
0112	Thursday 8:30 – 10:20 pm	Tuesday 8:30 – 10:20 pm
0113	Monday 1:30 – 3:20 pm	Friday 10:30 – 12:20 pm

Lab Start Dates: The Design and Computer labs will start on Monday September 12th and end on Wednesday November 30th resulting in 11 sessions for each section in each lab.

Dates with no Labs: There are no labs on Thursday September 8th, Friday September 9th, Monday October 10th (Thanksgiving), Tuesday October 11th (Fall Study Break Day), Wednesday November 23rd, Thursday December 1st or Friday, December 2nd.

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 the instructor)

Lectures	Lecture Topics	Text Chapters	Learning Objectives
Week 1	Course Introduction & Bad Design		
Week 2	Engineering Design Process SOE Shop Access Safety (Green Card)	15	1, 2, 6
Week 3	Divergence & Convergence	15	1, 2, 6
Week 4	Professional Engineering	1, 3	5, 6
Week 5	Project Management	16	5, 7
Week 6	Project Documentation	6-9	3, 5
Week 7	Life Cycle Techniques		5, 6
Week 8	Ethical Theories & Cases		5, 6
Week 9	Ethical Theories & Cases		5, 6
Week 10	Design for Safety	17, 18	5, 6
Week 11	Design for Sustainability	19	5, 6
Week 12	PEO, PEng, Accreditation & Course Wrap Up	2	

5.3 Design & Computer Lab Approximate Schedule

Week	Dates	Computer Lab (THRN 2313)	Design Lab (THRN 1435)
1	Sept 12 - 16	Introduction to Computers SolidWorks 1	Team & Design Exercises
2	Sept 19 – 23	Arduino 1, SolidWorks 2	Sketch 1
3	Sept 26 – 30	Quiz 1 (Solid Works) SolidWorks 3	Design Project Launch, Team forming, Constraints Exercise Log Book 1
4	Oct 3 – 7	Arduino	Sketch 2
5	**Wed** Oct 12 – Tues Oct 18	AutoCAD 1	Ideas Exercises
6	Oct 19 – 25	AutoCAD 2	Safety Exercise, Log Book 2
7	Oct 26 – Nov 1	Quiz 2 (AutoCAD) Spreadsheets	Measurement, Criteria Exercise
8	Nov 2 – 8	AutoCAD 3	Life Cycle Exercise
9	Nov 9 – 15	AutoCAD 4 SolidWorks – Project Time	Sketch 3
10	Nov 17 – 22	Quiz 3 (AutoCAD) AutoCAD 5	Aesthetic Assessment Open Project Time Log Book 3
11	Nov 24 – 30	Innovation Assessments (Peers)	Design Assessment, Kit Returns

Note: No labs on Sept. 8th & 9th, Oct. 10th & 11th, and Nov 23rd, Dec. 1st & 2nd.

5.4 Other Important Dates

Monday, October 10th - Thanksgiving holiday, no classes
Tuesday, October 11th - Fall Study Break Day, no classes
Friday, November 4th - 40th class day – last day to drop one-semester courses
Thursday, December 1st - Tuesday Schedule in effect as make up for Fall Study Break Day
Friday, December 2nd - Monday Schedule in effect as make up for Thanksgiving

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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 prior to your enclosure being installed.

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 permission to use the space then their card works at the door. If their card doesn't work then it may be because they have lost permission based on previous actions.
- 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 (other units between this one and the gap will also move)
- Accessing your storage unit
    - Do not leave your unit's doors open even if you are working a few feet away.
    - THIS IS FOR REASONS OF SAFETY AND RESPECT OF OTHERS
- Accessing units using mobile stairs
    - If you have a unit on higher rows (3rd and 4th) then you need to use the mobile stairs to safely access your 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.**

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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:
http://www.uoguelph.ca/engineering/undergrad-counselling-ethics

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 that 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 academic misconduct.

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