ENGG*3100 Engineering & Design III
Winter 2016

School of Engineering

(Revision 0: January 11, 2016)

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1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor:	Ryan Clemmer, Ph.D., P.Eng.	Instructor:	John Donald, P.Eng.
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Email:	rclemmer@uoguelph.ca	Email:	jrdonald@uoguelph.ca
Office hours:	By appointment	Office hours:	By appointment
Instructor:	Bahram Gharabaghi, Ph.D., P.Eng.	Instructor:	April Khademi, Ph.D., P.Eng.
Office:	THRN 2417, ext. 58451	Office:	RICH 2417, ext. 58451
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Office hours:	By appointment	Office hours:	By appointment

1.2 Teaching Assistants

GTA	Email	Office Hours
Andrew Beney	abeney@uoguelph.ca	During lab time
Matteo De Stefano	mdestefa@uoguelph.ca	During lab time
Erika Fiedler	efiedler@uoguelph.ca	During lab time
Saki Honjo	shonjo@uoguelph.ca	During lab time
Griffin Lacey	laceyg@uoguelph.ca	During lab time
Mary Mekhail	mekhailm@uoguelph.ca	During lab time
Michael Mosco	mmosco@uoguelph.ca	During lab time
Aurelien Osman	aosman@uoguelph.ca	During lab time

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*3100 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

1. I<clickers for quizzes

2.3 Recommended Resource to Improve Your Technical Writing Skills

1. Thorsten Ewald. 2014. Writing in the Technical Fields, A Practical Guide. Oxford Univ. Press. http://www.coursesmart.com/writing-in-the-technical-fields/ewald/dp/9780199018475

2.4 Additional Resources

1. Additional useful resources will be posted on Courselink.

Lecture Information: All of the necessary lecture notes will be posted on Courselink.

Lab Information: All of the necessary lab resources will be posted on Courselink.

Assignments: There are no assignments for this course.

Exams: There are no midterm or final exams for this course.

Miscellaneous Information: Design project expectations, project list and descriptions, deliverable descriptions and evaluation rubrics 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 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. E-mails to course professors should have ENGG*3100 in the subject line.

3 ASSESSMENT

3.1 Dates and Distribution

	Assessment Item	Worth	Due Date	Submission Format
Participation & Engagement	Clicker Quizzes (Best 8 of 10)	10%	Tues. on week 1, 3 – 10, 12	in class
	Project Management	8%	Updates on week 5, 7, 9, 11 during labs	team project website
Team & Project Selection	Partner & Project Selection	2%	Jan. 25th at 8:30 am	electronic on Courselink
Design Proposal	Design Proposal*	10%	Feb. 1st at 11:59 pm	electronic on Courselink
	Proposal Process Reflection Form 1	Pass/Fail	Feb. 8th at 11:59 pm	electronic on Courselink
Preliminary Design Report	Preliminary Design Report	20%	Feb. 22nd at 11:59 pm	electronic on Courselink
Technical Design Review & Presentation	Design Review Technical Memo	10%	Mar.7th at 11:59 pm	electronic on Courselink
	Design Cost Memo	5%	Mar.21st at 11:59 pm	electronic on Courselink
	Design Review Presentation	10%	Mar. 28th at 11:59 pm	electronic on Courselink & presented in labs and in lectures (week 11)
Final Design Report and Reflection	Final Design Report*	25%	Apr. 8th at 11:59 pm	electronic on Courselink
	Final Report Reflection Form 2	Pass/Fail	Apr. 11th at 11:59 pm	electronic on Courselink

Note: deliverables with the "" require satisfactory completion of a "Process Reflection Form" to be completed individually through ePortfolio on Courselink by the due date. Failure to complete this form will result in an "Incomplete" grade for that individual for the deliverable.

Partner & Project Selection Process:

- Design work will be completed in teams of 4 or 5 (and occasionally 6) students;
- Every 2 or 3 students will form a team within their first lab section and pick their top nine preliminary project ideas (three from each bin) suggested by the table below and submit

hard copy to the instructors **within** the first lab section; the teams are then encouraged to find another team from the same lab section with complimentary disciplines of engineering for design project of interest to form a group of 4 or 5 (and occasionally 6);

- The instructors will then review the membership of the groups following the end of the add/drop period (*Friday*, January 15) and make additional changes to the membership of the groups as necessary and publish the list of group members on the course website on Friday January 15th; and
- The design teams will spend the labs on week two (January 18 - 22) to finalize the design project title and submit the Partner & Project Selection form by Jan. 25th at 8:30 am on Courselink;

Sustainable Designs	Industrial Systems	Smart Technologies
1. Grey Water Recovery	12. Physical Resources Green Gryphon	22. Smart Walking Assist
2. VIQUA UV Water Treatment	13. Pepsico Conveyor Belt System	23. Smart Water Bottle
3. Water Filter for Low Income	14. Distributed Residential Electricity	24. Cooled Ebola Protection Suit
4. Solar Water Preheater	15. Pepsico Bagging Machine System	25. SMA mobility during air travel
5. City of Guelph Stormwater Design	16. Electric Wheel Chair and Control	26. Hospital Contamination Control
6. Athletic Centre Green Wall	17. Heat Recovery - UofG Arena	27. Ultrasonic Blind Stick
7. Water for Native Community	18. Refugee Desert Shelter	28. Fetal Heartbeat Monitor
8. Rainwater Harvesting System	19. Desalination System	29. Remote Health Clinic
9. Green Roof Design	20. Geothermal Heating and Cooling	30. Smart Stethoscope
10. Portable Sustainability Classroom	**21. "Other Suitable Project Ideas"**	31. Smart Lighting System
11. **"Other Suitable Project Ideas"**		32. **"Other Suitable Project Ideas"**

Individual and Team Assessments:

- Individual grades may differ from team grades in positive and negative ways
  - Individuals not carrying their weight (quality or quantity) based on peer comments and/or instructor observations may receive a reduced grade. A severe quantity issue may lead to academic misconduct.
  - Individuals serving as exceptional leaders based on peer comments and/or instructor observations may be awarded a bonus.
- Individuals are required to keep track of their individual efforts throughout the semester – individual meeting notes, design ideas, design analysis work, etc. The professors may request to see this individual information when a reduced grade is being considered. Aspects of this information will also be posted on the team project management website.
- Students are required to back-up work frequently and keep copies of all submitted work for your own protection and for possible re-submission if requested.

Lab Work: You must attend and complete all laboratories. If you miss a laboratory due to grounds for granting academic consideration or religious accommodation, alternative arrangements must be made. The following list represents non-negotiable expectations for you during the lectures, labs, and for all group meetings.

1. Maintain **courteous relations** with all fellow group members;
2. Maintain the **highest standards of integrity**, personal and professional conduct;
3. **Familiarize yourself with and abide** by the letter and spirit of all applicable documents, policies, rules and regulations;
4. Comply with **both the letter and spirit of the law** to design a functional, safe, durable, cost-effective, environmentally-friendly, and socially beneficial design.
5. You are expected to **attend all Lab sessions**. If you are unable to make one of your lab sessions in the case of an emergency it is essential that you let the professor know about your absence.
6. You are expected to **attend all group meetings** or clearly communicate with every one of your group members when you are unable to meet.
7. **Distribute the workload** among team members as fairly as possible. Expectations for work quality and timing of deliverables must be communicated to and agreed upon by all group members.
8. It is expected that all **submitted work is original** or properly referenced.
9. Carefully **review any work** that is submitted by your group with your name on it, even if it was completed by one of your group members.

3.2 Course Grading Policies

Quizzes: There will be several i>clicker quizzes during the lectures throughout the semester as scheduled. Students are required to be present and use their own i>clicker during these quizzes. Impersonating a fellow student by using their clicker upon that student's behalf is an academic offense. The quizzes are intended to help you better understand the course content and account for 10% of the course marks. Prior to the first quiz, you must register your i>clicker serial number by clicking on the *"Student i>clicker Registration"* link: **https://www.uoguelph.ca/courselink/d2ltools/admin/signon.cfm?destination=index.cfm**

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 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

Late Submission Penalties: late penalty of 40% per day or part thereof for any late document submissions will be applied. Submissions are considered late if they are submitted after the specified due date.

Passing grade: In order to pass the course, you must obtain a final grade of 50% or higher. If a student feels that a particular deliverable was graded unfairly, or if there is an error in the grading, it should be brought to the attention of the Instructor within one week after the grade is posted on Courselink. Scores posted on Courselink will not be reconsidered beyond this period.

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. For group projects, students must also state that they contributed to the group effort in an equitable manner.

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

This course combines the knowledge gained in the advanced engineering and basic science courses with the design skills taught in ENGG*1100 and ENGG*2100 in solving open-ended problems. These problems are related to the student's major. Additional design tools are presented, including model simulation, sensitivity analysis, linear programming, knowledge-based systems and computer programming. Complementing these tools are discussions on writing and public speaking techniques, codes, safety issues, environmental assessment and professional management. These topics are taught with the consideration of available resources and cost.

Prerequisite(s): Registration in the B.Eng. program and completion of 6.00 credits of ENGG courses including ENGG*2100
Restriction(s): Students must have a minimum cumulative average of 60% or higher in ALL ENGG courses. Restriction waiver requests are handled by the Director, School of Engineering, or designate.

University of Guelph Credits: 0.75 (Nominally 15 h per week for a B student to earn a B)

4.2 Course Aims

This course builds on the design skills taught previously and focuses on a project-based model of learning. The lab time is designed to use a studio-style pedagogical approach to design. Each student is to apply the knowledge that they learned in their discipline-specific courses in the design environment.

4.3 Learning Objectives

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

1. Apply fundamental skills from core engineering skills depending on the discipline to a real-world engineering problem.
2. Determine appropriate engineering analysis methods and results to be considered in creating engineering design criteria and constraints.
3. Build on design and analytical knowledge to expand experience working with the design cycle through creating, developing, assessing and implementing a design solution.
4. Select, apply, and recognize the limitations of various engineering design tools, including model simulation and sensitivity analysis as they pertain to the engineering design process.
5. Critically evaluate information from many sources including engineering journals, data processing, and engineering analysis, and disseminate the information in both technical reports and technical communication.
6. Recognize professional and ethical behaviour and perform accordingly.
7. Analyze the social, environmental, economic and legal impacts of the engineering design process and engineered products and services.
8. Apply project management techniques through allocating time and financial resources according to project and design constraints.

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	1, 2	Reports, Presentation, Quizzes
2. Problem Analysis	2	Reports, Presentation
3. Investigation	-	Reports, Presentation
4. Design	1, 2, 3, 4, 5, 7	Reports, Presentation
5. Use of Engineering Tools	4	Reports, Presentation, Quizzes
6. Communication	5	Reports, Presentation, Quizzes
7. Individual and Teamwork	-	Reports, Presentation
8. Professionalism	6	Reports, Presentation
9. Impact of Eng. on Society and the Env.	7	Reports, Presentation, Quizzes
10. Ethics and Equity	6	-
11. Environment, Society, Business, & Project Management	7, 8	Reports, Presentation
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/undergrad-counselling-forms are both essential resources.

4.7 Relationships with other Courses & Labs

Previous Courses:

ENGG*1100: Design 1 – an emphasis on the design process

ENGG*2100: Design 2 – an emphasis on computer tools

Examples of Follow-on Courses:

ENGG*41x0: Capstone design course that brings all design and analysis together

ENGG*4680: Multidisciplinary Engineering Design

5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures:				
Monday		8:30 – 9:20	THRN 1200 & 1006	Week 1,2,3,4,5 and 11
Wednesday		8:30 – 9:20	THRN 1200 & 1006	Week 1,2,3,4,5 and 11
Friday		8:30 – 9:20	THRN 1200 & 1006	Week 1,2,3,4,5 and 11
Tuesday		17:30 – 18:50	ROZH 104	All 12 weeks
Laboratory:				
Tuesday	0101	15:30 – 17:20	THRN 1002, 1006, 1435	
Wednesday	0102	12:30 – 14:20	THRN 1002, 1006, 1435	
Thursday	0103	15:30 – 17:20	THRN 1002, 1006, 1435	
Friday	0104	9:30 – 11:20	THRN 1002, 1006, 1435	

Attendance is expected for all lectures and for your assigned lab sections.

Students are responsible for all information presented in the class and labs and student participation is highly encouraged. The dynamics of each learning activity should be based on professionalism and mutual respect. Cell phones are to be turned off during the class, ear buds must be put away, and the use of laptops and tablets in class is restricted to taking class notes. Everyone in the classroom has the right to participate and contribute. If there is anything that may prevent your full contribution, let the instructors know as soon as possible. The learning environment must be free from harassment.

5.2 Lecture Schedule

Week	Lecture Topics	Learning Objectives
1	Industry Presentations Project Ideas & Research Methods	1,5
2	The Design Process	2, 3
3	Writing Technical Reports	4, 5, 7
4	Project Management & Due Diligence	7
5	Life Cycle Analysis	7
6	Project Management	8
7	Environmental Impact	7
8	Cost Analysis	4, 5
9	Design and Social Implications	7
10	Intellectual Property	6
11	Design Project Presentations	6
12	Graduate Studies and 41x	6

5.3 Other Important Dates

Monday, January 11, 2015: First day of class
Monday, February 15 – Friday, February 19, 2015: Winter Break
Friday, March 11, 2015: drop date – 40th class
Friday, March 25, 2015: Holiday, no classes
Friday, April 8, 2015: last day of classes

6 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.

If the laboratory rules are not followed, consequences will include removing student's access to the lab. If this results in lab work not being completed, the student will receive a grade of 0.

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.

Please take note of the Acceptable Use Policy of University of Guelph for Information Technology:

https://www.uoguelph.ca/cio/content/aup-acceptable-use-policy

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

7.1.1 Turnitin

Accounts are available to students on Turnitin to help with the editing of their submissions to ensure that plagiarism does not take place. Go to http://www.turnitin.com/en_us/home and create an account. For W16, Class ID: 11334666 and password 3100W16. The School has been assured by the College that Turnitin does not store student work, so please take advantage of this tool when preparing your written submissions.

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?ind