

Course Outline
Engineering and Design I, ENGG*1100
University of Guelph
School of Engineering
Fall 2009

Instructors W. David Lubitz, PhD, P.Eng.

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GTA's

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Design Seminar GTA Help Hours

Room 1158, Tue 5:30-6:30 PM
Thurs 5:30-6:30 PM
Starting Sept. 22nd.

Graphics Laboratory GTA Help Hours

Room 2313, Mon 5:30-6:30PM
Wed 5:30-6:30PM
Starting Sept 28th and not available
during the week of Oct. 12-16

Required Texts

1. "Introduction to Professional Engineering in Canada", G. Andrews, J. Dwight Applevich, R. Fraser and H. Ratz, Prentice Hall. (2nd or 3rd Edition)
2. "Engineering Graphics Essentials With AutoCAD 2010 Instruction", K. Plantenberg, SDC Pubs. ISBN 978-1-58503-517-5 (Text only)

Schedule

Lectures:	Tue.	8:30-9:20	AXEL 200	
	Thu.	8:30-9:20	AXEL 200	
Design Seminars:	Mon.	9:30 -11:20	THRN 1103	cont...

Mon.	11:30 - 1:20	THRN 1103
Mon.	1:30 - 3:20	THRN 1103
Tues.	9:30 -11:20	THRN 1103
Wed.	9:30 -11:20	THRN 1103
Wed.	11:30-1:20	THRN 1103
Wed.	1:30 - 3:20	THRN 1103
Thurs.	9:30 -11:20	THRN 1103
Fri.	9:30-11:20	THRN 1103
Fri.	11:30 - 1:20	THRN 1103

Graphics Labs:	Mon.	9:30-11:20	THRN2313
	Wed.	9:30 -11:20	THRN2313
	Wed.	11:30-13:20	THRN2313
	Thu.	9:30-11:20	THRN2313
	Thu.	2:00-3:50	THRN2313
	Fri.	9:30-11:20	THRN2313

Course Description

Engineering and Design I is intended to provide a firm basis for engineering design that will be broadly applicable in all areas of engineering. 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 is stressed. The practice of professional engineering and the role of ethics in engineering are also covered.

This is a course designed to introduce students to engineering and the process of engineering design and analysis. Introduced are some of the key tools used in engineering including the use of spreadsheets (Excel), word processors (Word), and graphics (AutoCAD 2010). Emphasis is on developing skills with elementary tools which will be used throughout the engineering program and beyond, the importance of communication through drawings, presentations and writing and the key steps in solving most engineering problems.

Course Learning Objectives

A successful student will

- develop engineering skills necessary to address technical problems.
- develop a systematic methodology for design.
- develop good engineering communication skills.
- develop analytical/design skills.
- develop creativity, problem solving, and decision-making techniques.
- develop teamwork and leadership skills.
- become familiar with the technical drawing and graphics language as means of expressing and communicating an engineering design.

Grade Evaluation

Assignments	40%
Term Project	30% (Set of assignments related to the project; see below)
Final Exam	30%

Important Notes

- Some assignments will be due at the end of your scheduled design seminar/graphics lab session. These must be submitted by the end of the lab or seminar session. If you have not completed the assignment, submit what you have completed. **Late assignments will not be marked.**
- Some assignments are up to two weeks **after the session in which they are assigned**. The submission instructions provided with each assignment will give the location and time at which the assignment is to be submitted. **Late assignments will not be marked. This includes group project assignments.**
- Individual and original assignments are to be submitted by each student unless otherwise indicated. For group assignments, each group must submit an original assignment.
- Students are expected to attend their assigned graphics and problems lab sessions. The teaching assistants will give final and updated instructions during the lab sessions.
- Unless otherwise noted, all assignments are to be submitted on suitable engineering paper.
- The lowest Graphics Lab assignment mark will be excluded from the final grade calculation
- **The final exam is scheduled for December 15, 2009 (11:30 am -1:30 pm).**
- Communications regarding this course will frequently involve the use of CourseLink (<http://courselink.uoguelph.ca/>) and e-mail. Students are responsible for checking the CourseLink web site and your university email account for all instructions and announcements. It is expected that this will be done at least once every week.
- **First: Learning resources for first-year students.** First is a collection of resources, services, and technologies designed to help make the transition to university learning smooth and successful. Visit the First website to register for workshops, find out about Supported Learning Groups, and make individual appointments with staff or Peer Helpers. <http://www.lib.uoguelph.ca/first/>
- The instructors of ENGG*1100 reserve the right to change the course material, procedures and marking methods in this outline at any time during the course at their discretion.

Term Project

Each student is required to complete a term project as part of this course. Projects are to be done in groups of 5 or 6 students from the *same design seminar section*. Project groups will be assigned in the first seminar sections during the week of Sept. 14-18, 2009. If you do not attend your seminar section this week, you will be assigned to a group during the seminar section. The instructors and teaching assistants may add students to groups, or change group membership, after initial group formation.

The project will comprise five submitted assignments and a design review. The project-related assignments and the portion of the overall project mark (which is 30% of the overall course mark) allocated to each assignment are:

Preliminary Ideas	10%
Design Report and Construction Instructions	25%
Construction Lab Feedback	10%
Testing Memo	15%
Final Report	30%
Design Review	10%

The **final project mark** for each member of a design group will depend on **his/her performance** within the group. Each member of the group will be responsible for submitting a Group Performance Summary to identify their individual contribution relative to the rest of the group.

University Policy on Academic Misconduct

Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph. Please consult the Undergraduate Calendar 2008-2009 and School of Engineering program guide for offences, penalties and procedures relating to academic misconduct.

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Design Section (Schedule of Topics)

Week and Readings	Lecture Material (every Tuesday in Axelrod 200)	Seminar Topic and Location	Seminar Assignment
Sep. 14-18 Before lecture, read Andrews et al., Sections 15.1-15.3 and 6.2	<u>The Engineering Design Process</u> - engineering design; design process - problem definition, constraints & criteria - the design loop	Group Formation and Teambuilding Lab Thornbrough 1103	<i>None</i>
Sep. 21-25 Before lecture, read Andrews et al., Sections 15.4-15.9	<u>Preliminary Ideas & Design Teams</u> - team organization & dynamics - design notes, information gathering - information gathering, brainstorming	Information Sources All sections meet in <u>Library 034A at regular time</u> except: 1. Mon. 11:30 section: meet in Library 200A at 11:30 am. 2. Wed. 9:30 section: meet at 8:30 am (end at 10:20) in 034A.	Research & Info. Sources
Sep. 28-Oct. 2 Before lecture, read Andrews et al., Chapter 18	<u>Problem Analysis & Resources Planning</u> - analysis of design process - time & resource planning & scheduling - CPM & Gantt Charts	Problem Definition Thornbrough 1103	Design Process: Problem Definition
Oct. 5-9 Before lecture, review Andrews et al., Section 15.5	<u>Decision-Making</u> - evaluating alternatives - basic decision-making method - decision matrix; criterion functions	Brainstorming Thornbrough 1103	Design Process: Preliminary Design Ideas
Oct. 12-16 Before lecture, read Andrews et al., Section 6.1 and Chapters 7 and 8	<u>Design Implementation & Reporting</u> - design reports; design reviews, demonstration and report	<i>No seminar</i> <i>Thanksgiving Day Week</i>	<i>None</i>
Oct. 19-23 Before lecture, read Andrews et al., Chapters 10 and 11	<u>Engineering, Units, Measurement & Errors</u> - the role of an engineer, engineering calcs., measurements, basic units - uncertainty, sig. figures, estimating errors	Finalized Design Thornbrough 1103	Design Report and Construction Instructions
Oct. 26-30 Before lecture, read Andrews et al., Chapters 12	<u>Testing and Performance Evaluation</u> - Testing of engineered systems - Testing documentation	Construction Lab I Thornbrough 1103	Construction Feedback
Nov. 2-6 Before lecture, read Andrews et al., Section 6.3	<u>Technical Presentations</u> - preparation of material - delivery, visual aids, formal meetings	Testing Lab I Thornbrough 1103	Testing Memo
Nov. 9-13 Before lecture, read Andrews et al., Chapter 3	<u>Engineering Ethics</u> - professional obligations - ethics of engineering practice - ethics case studies	Design Reviews Thornbrough 1103	Presentation Peer Review
Nov. 16-20 Before lecture, read Andrews et al., Chapter 2	<u>Professional Practice & Code of Ethics</u> - engineering as a profession, PEO membership & code of ethics	Construction Lab 2 Thornbrough 1103	Ethics Assignment
Nov. 23-27	<u>Canadian Engineering</u> - special lecture	Testing Lab 2 Thornbrough 1103	Final Report
Nov. 30-Dec.4	<u>Course Review & Evaluation</u>	<i>No seminar</i>	

Engineering Graphics Communication Section (Schedule of Topics)

Lecture Material (every Thursday in Axelrod 200)	Graphics Lab Assignment (in Thornbrough 2313)
Sept 10: <u>Course Introduction</u>	Sept 14-18: <u>Intro to Computing Facilities</u> (entering your schedule) ***Labs Start <u>Monday September 14th</u>
Sept 17: <u>Drawing and Documenting Design Ideas</u> - design communication through drawing	Sept 21-25: <u>Drawing Part 1</u> (draw a building)
Sept 24: <u>Technical Drawing</u> - graphic communication for the purpose of production	Sept 28-Oct 2: <u>Drawing Part 2</u> (sketching a design)
Oct 1: <u>Graphs and Spreadsheets</u> - using graphs and spreadsheets	Oct 5-9: <u>Graphs and Spreadsheets</u> (graphing a set of data)
Oct 8: <u>Guest Lecture – Learning Services</u> - course selection, help/resources on campus	Oct 12-16: <u>No Lab or Assignment This Week</u>
Oct 15: <u>Orthographic Projection Part 1</u> - material from Chapter 2 of Graphics textbook *(bring Graphics textbook to class)	Oct 19-23: <u>Drawing In AutoCAD</u> (basic shapes in AutoCAD) ** <u>Before</u> the lab read Chapter 1 and perform the suggested tutorials
Oct 22: <u>Orthographic Projection Part 2</u> - material from Chapters 2&4 *(bring Graphics textbook to class)	Oct 26-30: <u>Orthographic Projection</u> (orthographic projection) ** <u>Before</u> the lab read Chapter 1&3 and perform the suggested tutorials
Oct 29: <u>Dimensioning Part 1</u> - material from Chapter 4 *(bring Graphics textbook to class)	Nov 2-6: <u>Detailed Drawing</u> (basic technical drawing) ** <u>Before</u> the lab read Chapter 3 and perform the suggested tutorials
Nov 5: <u>Dimensioning Part 2</u> - material from Chapter 4 *(bring Graphics textbook to class)	Nov 9-13: <u>Dimensioning</u> (advanced dimensioning) ** <u>Before</u> the lab read Chapter 5 and perform the suggested tutorials
Nov 12: <u>Sectioning/Tolerancing</u> - material from Chapter 6&8 *(bring Graphics textbook to class)	Nov 16-20: <u>Sectioning</u> (creating a section in AutoCAD) ** <u>Before</u> the lab read Chapters 7&9 and perform the suggested tutorials
Nov 19: <u>Assembly Drawings</u> - material from Chapter 12 *(bring Graphics textbook to class)	Nov 23-27: <u>Assembly Drawings</u> (creating an assembly in AutoCAD) ** <u>Before</u> the lab read Chapter 13 and perform the suggested tutorials
Nov 26: <u>Graphics Review</u>	Nov 30-Dec 3: <u>No lab this week</u>