

Course Outline
Engineering and Design I, ENGG*1100
University of Guelph
School of Engineering
Fall 2008

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Text "Introduction to Professional Engineering in Canada", G. Andrews, J. Dwight Applevich, R. Fraser and H. Ratz, Prentice Hall
"Engineering Graphics Essentials", 3rd ed., K. Plantenberg, SDC Pubs.

Schedule

Lectures:	Tue. 8:30-9:20	MAC 149
	Thu. 8:30-9:20	MAC 149
Problems Seminar	Mon 9:30 -11:20	THRN1103
	Wed 11:30-13:20	THRN1103
	Wed 9:30 -11:20	THRN1103
	Fri 9:30-11:20	THRN1103
Graphics Labs	Fri 9:30-11:20	THRN2313
	Wed 9:30 -11:20	THRN2313
	Wed 11:30-13:20	THRN2313
	Thu 14:00-15:50	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 is 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 LT 2000). 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

- develop the engineering skills necessary to address technical problems.
- develop a systematic methodology for design.
- develop good 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	30%
Term Project	20%
Final Exam	50% (10% computer based in lab + 90% based on lecture material)

Important Notes

- Assignments are due on the day of your scheduled problem/graphic lab session, **one week after the session at 10:00am**. These are to be submitted in the appropriate box in the foyer of the engineering building. **Late assignments will not be marked.**
- Individual and original assignments are to be submitted by each student unless otherwise indicated.
- Students are expected to attend their assigned graphics and problems lab sessions. The TAs will give the final and updated instructions during the lab sessions.
- Unless otherwise noted, all assignments are to be submitted on suitable engineering paper.
- **The final exam is scheduled for December 1, 2008 (8:30-10:30)**. Note that the final exam will include a **graphics** lab portion during the **last scheduled graphics lab**.
- 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.

Term Project

Each student is required to complete a term project as part of this course. The project will involve the preliminary proposal, final proposal, final report and presentation on a subject detailed in the problem assignments. Projects are to be done in groups of from 4 or 5 from the *same problem lab section*, either selected by the students or assigned by the instructor. Students wishing to create their own groups must do so by **September 24th** by submitting the names of their groups to the instructor. Those students not yet in groups at that time will be assigned to groups by the course instructor and a full list of groups published on **September 28th**.

The project will comprise problem assignments P3, P6, a project report and a presentation. Grading for the projects will comprise all of these but P3, which will be graded separately. The breakdown of the grading for the projects will be:

P6	10%
Presentation	10%
Performance	20%
Final Report	60%

The **final project mark** for each member of a design group depends 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>

Problems Solving Section (Schedule of Topics)

Week	Lecture Material (every Tuesday)	Seminar Lab Assignment
Sep. 4-10	<u>Engineering, Units, Measurement & Errors</u> - the role of an engineer, engineering calcs., measurements, dimensions basic units - uncertainty, sig. figures, estimating errors	No lab assigned
Sep. 11-17	<u>The Engineering Design Process</u> - engineering design; design process - problem definition, constraints & criteria - the design loop	P1-Engineering Approximations
Sep. 18-24	<u>Preliminary Ideas & Design Teams</u> - team organization & dynamics - design notes, information gathering - information gathering, brainstorming	P2-DesignProcess: Problem Definition
Sep. 25-Oct. 1	<u>Problem Analysis & Recourses Planning</u> - analysis of design process - time & resource planning & scheduling - CPM & Gantt Charts	P3-DesignProcess: Preliminary Design Ideas
Oct. 2-8	<u>Decision-Making</u> - evaluating alternatives - basic decision-making method - decision matrix; criterion functions	P4-Project Planning & Scheduling
Oct. 9-15	<u>Design Implementation & Reporting</u> - design reports; final presentation, demonstration and report	P5 - Information Sources Exercise
Oct. 16-22	<u>Canadian Engineering</u> - Highlights of engineering accomplishments in Canada	P6-Term Project: Preliminary Design
Oct. 23-29	<u>Economic Analysis</u> - cost considerations converting between types of cost - equivalent uniform annual cost - Cash flow diagrams	No lab assigned
Oct. 30-Nov. 5	<u>Professional Practice & Code of Ethics</u> - engineering is a profession, PEO membership & code of ethics - engineering seal, iron ring	P7 - Engineering Design and Economic Analysis
Nov 6-12	<u>Technical Presentations</u> - preparation of material - delivery, visual aids, formal meetings	P8 - Engineering Ethics
Nov. 13-19	<u>Contemporary Engineering</u> - special lecture	P9 - Critical Evaluations
Nov. 20-26	<u>Course Review & Evaluation</u>	Project Presentations

Graphics Section (Schedule of Topics)

Week	Lecture Material (every Thursday)	Graphics Lab Assignment
Sep. 4-10	<u>Intro. To Engineering Graphics</u> - basic background information - visualization, scale, etc.	G1-Introduction to the SOE Computing Facilities (THRN 2313).
Sep. 11-17	<u>Graphics and Communications Part 1</u> - communicating ideas in Engineering	G2-Hand Sketching (THRN 2313).
Sep 18-24	<u>Graphics and Communications Part 2</u> - graphs and spreadsheets - technical writing	G3-Graphs and Spreadsheets Using Excel (THRN 2313).
Sep 25-Oct. 1	<u>Orthographic Projection Part 1</u> - material from chapter 1 of course textbook Engineering Graphics Essentials	G4-Lecture Assignment on Orthographic Projection and Introduction to the Machine Shop (THRN 1170).
Oct. 2-8	<u>Orthographic Projection Part 2</u> - material from chapter 1 of course textbook Engineering Graphics Essentials	G5-AutoCAD Basics Part 1 (THRN 2313).
Oct. 9-15	<u>Dimensioning Part 1</u> - material from chapter 2 of course textbook Engineering Graphics Essentials	G6-AutoCAD Basics Part 2 (THRN 2313).
Oct. 16-22	<u>Dimensioning Part 2</u> - material from chapter 2 of course textbook Engineering Graphics Essentials	G7-AutoCAD Advanced Part 1 (THRN 2313).
Oct. 23-29	<u>Sectioning</u> - material from chapter 3 of course textbook Engineering Graphics Essentials	G8–Lecture Assignment on Dimensioning (THRN 2313).
Oct. 30-Nov. 5	<u>Tollerancing</u> - material from chapter 4 of course textbook Engineering Graphics Essentials	G9– AutoCAD Advanced Part 2 (THRN 2313).
Nov. 6-12	<u>Assembly Drawings</u> - material from chapter 6 of course textbook Engineering Graphics Essentials	G10- AutoCAD Advanced Part 3 (THRN 2313).
Nov. 13-19	<u>Pictorial Drawings</u> - material from Chapter 7 of course textbook Engineering Graphics Essentials	G11-Lecture Assignment on Pictorial Drawings (THRN 2313)
Nov. 20-26	<u>Course Review and Makeup lecture</u>	Graphics Lab Computer Assessment (THRN 2313).