Engineering & Design II (ENGG*2100)
Fall 2009 Course Outline

Instructor: Warren Stiver,
Professor & NSERC Chair in Environmental Design Engineering
Rm 1343, Thornbrough Bldg,
x 54862
wstiver@uoguelph.ca
Office Hours: 10:50 to 11:15 on Tues/Thurs in
Plus, any time that I am in my office (Zimbra calendar access)

Teaching Assistants: (No office hours)
Jennifer Spencer
Matt Renaud
Malo Bourgon
Willy DeWitt (1/2)

Teaching Support:
Ken Graham (Shop)

Prerequisites:
ENGG*1100 plus 4.0 credits
(It is expected that students will have completed the majority of the first year courses and be taking the majority of the semester 3 courses for their engineering program)

Undergraduate Calendar Description:
*ENGG*2100 Engineering & Design II. F(2-4)*. [0.75]
Progression in engineering design skills with particular emphasis on computer usage in design, on oral communication of solutions and team skills. Computer usage in design will include advanced CAD/CAM/CAE tools, structured programming and database management software. An introduction to safety in engineering practice and design. An introduction to the concept of sustainable development.

Credit Weighting:
0.75
This means an *average* student requires about 15 hours per week to get a 'B' grade. This 15 hours includes the 6 hours of scheduled class time per week.

Learning Objectives, Accreditation Units and Graduate Attributes

The University of Guelph has a series of Learning Objectives (UofG Academic Calendar). The Province of Ontario has established University Degree Level Expectations (UDLEs). The Canadian Engineering Accreditation Board (CEAB) assesses engineering programs using Accreditation Units and has recently introduced twelve graduate attributes has outcomes assessment measures. ENGG*2100 delivers 68 AU's (of the total 1950 required by CEAB) of which 75% are for design and 25% for complementary studies (mostly communication). In terms of twelve graduate attributes, ENGG*2100 directly supports Design (#4), Use of Engineering Tools (#5), Individual and Team Work (#6), Communication skills (#7), Professionalism (#8), Impact of Engineering on Society and the Environment (#9), and Life-long learning (#12).

Class times: Course Section Code: 10YZ (Y Lab; Z tutorial)

LECTURES

ALL (in LA204) Tu, Th 10:00 - 10:50

LAB

You MUST attend your assigned section only
Lab Attendance is expected for all weeks.
All of the following rooms THRN 1135, SHOP (THRN 1170), THRN 1103

Sections

Y=2	Friday	2:30-5:20
Y=3	Tuesday	2:30-5:20
Y=4	Thursday	2:30-5:20

TUTORIAL

You MUST attend your assigned section only
Attendance is required Week 2 (Sept 17-22) PLUS two additional weeks as scheduled. Schedule will be posted via Design2Learn system.

Sections

Z=1	Thursday	11:30 - 12:20	THRN 1103
Z=2	Tuesday	11:30 - 12:20	THRN 1103
Z=3	Tuesday	1:30-2:20	THRN 1103

Textbook & Reading Material:

No required textbook.
There are a large number of books in the library that are relevant. Some website links are identified on the course website. Examples...

Cross N. (2000) *Engineering Design Methods: strategies for product design,* (TA174.C76)

Dieter G.E. (1983) *Engineering Design: A Materials and Processing Approach*, 1st Edition, McGraw Hill.

Hunter T.A. (1992) *Engineering Design for Safety*, McGraw-Hill, New York, 298p. (TA166.H86)

Additional Course Materials:

D2L

Posting course outline, team assignment, presentation schedules, project descriptions, lecture slides, reading material, old exams etc.

Computer Labs

Several copies of "*Parametric Modeling with UGS NX 5*" (Shih, 2007) will be available in the computer labs. You may purchase on-line if you wish your own copy (www.schroff.com).

Evaluation:

Team Design Project (1)	50% (including oral evaluation component)
CAE Project (1)	20% (including in lab evaluation component)
Presentation (2)	10%
Final Exam (1)	20% (

Note: A failing grade on the Team Design portion OR a failing grade on any two of the remaining three items will mean that you have failed the course. The assigned grade will be based on the failed items only.

Grading philosophy used recognizes that design has a significant artistic component and is not a right or wrong situation. Thus, we will start with a perspective that your work is assumed to be a "B" until there is evidence within that work that is impressive or aspects that are disappointing. Impressive and disappointing components are integrated to leave a final assessment. Letter grades are used to reflect that the process is not ±2% accurate and that design could never be assessed with fine resolution.

Letter grade translation:

A+	*Really Impressive*	*100*
A	*Impressive*	*90*
A-		*82*
B+		*78*
B	*Expected*	*75*
B-		*72*
C+		*68*
C	*Satisfactory*	*65*
C-		*62*
D+		*58*
D	*Disappointing, serious flaws*	*55*
D-		*52*
F	*Inadequate*	*35*
X	*no submission or wholly inadequate*	*0*

Academic Conduct Expectations and Academic Misconduct:
The team design project will have multiple written submissions. All team members must sign the cover sheet for the report. This cover sheet must also have the following statement.
In signing this cover page, I certify that I have been an active member of the team and provided approximately equal contribution to the work. I understand that taking credit for work that is not my own is a form of academic misconduct and will be treated as such.
(see UofG Calendar, 2002-2003, p30).

Respect for ownership of Intellectual Property (e.g. copyright, patents, trade marks, music, software) is important. Work that has been created or prepared with unlicensed or illegal software will not be knowingly accepted for submission within the course (e.g. a grade of zero will be assigned).

Team Design Project
You will each participate in one design-build-test project. You will be assigned to teams of approximately 5. You will advance your design, hands-on, database, team and communication skills.

CAE Design Project
A Computer-Aided-Engineering project will be completed (using NX5 software). There are both individual and team elements within this project.

Presentations
In Tutorials

You will each individually provide two oral presentations during your tutorial sessions. Effective oral presentation skills and comfort come from a combination of practice and feedback. It also comes from observing and considering what does and doesn't work for others. You are required to attend your tutorial section in Week #2 plus the two other weeks in which you are scheduled to present. Week 2 will be used to provide additional detail regarding the format and expectations, to provide you with the evaluation criteria that will be used, and to provide you with a range of presentation tips (Do's and Don't's). Weeks 2-6 are for oral presentations without any visual aids. Weeks 7-12 will be your scheduled presentation opportunity with visual aids. Powerpoint assistance will be provided during one of the computer labs. The schedule and topic for your two individual presentations will be posted through D2L. You are RESPONSIBLE for checking the schedule and attending the appropriate week. You are **required** to provide feedback to your colleagues who are presenting during your presentation weeks. You are free to attend other tutorials but you are not required to do so.

In Design-Build

You will be providing two team based presentations within your Design-Build project.

In CAE Task

You will be presenting your 3D drawing and, as a team, your assembly drawing.

Portfolio

Your individual and team presentations will be videotaped and added to your portfolio.

Final Exam:
The lecture component of the course is to assist in your design skill development. The lectures will not explicitly address the technical requirements of your Design Project or your Design Tasks. The Final Exam will be used to assess your understanding of this lecture material. The Final Exam will be closed book, no calculator and individual exercise.

Lecture outline:	*approximate # of hours*
Introduction	1
Team Skills	4
Creativity	4
Safety	7
Sustainable Development	7
Course Review	1

Engineering Portfolio
(folio.soe.uoguelph.ca; your account is your university login id and your password is your central login password)
We are continuing to develop the Guelph Engineering Portfolio system. The goal of the portfolio is to provide a focal point Guelph students to showcase their work. It will be a place where your work will stored. Once it is fully developed, you will have the option to permit prospective employers to see your work - your presentations, reports, spreadsheets, drawings, computer programs, engineering calculations etc. We will have the option to showcase to accreditation bodies and others the calibre of your work. It will take us some time to build all of these features and bring all of your courses online.

The Guelph Engineering Portfolio system has been developed by Ben Millen (ES&C - 2002), Ryan Connors (4th year ES&C), Katherine Sorensen, Jerry An and myself. Financial support for its development is from NSERC via my NSERC Chair in Environmental Design Engineering.

Comments:
All students are encouraged to submit signed written comments (positive or negative) to the Director of the School of Engineering on any aspect of this course.

Safety:

Many laboratory sessions will be held in the School's machine shop. The following safety principles apply to all sessions and to all students:

- Ken Graham has full authority for all aspects of our time in the shop
- There will be a maximum of 20 students in the shop at any point in time and this number can only be supported when both Ken and a GTA are present
- You will NOT be able to attend any lab session other than the one assigned to your lab section of the course (this includes Week 11 in which time pressures may increase your desire to attend additional times)
- You will be required to show respect for Ken, your GTA and the shop's equipment
- You will be required to dress appropriately
- No open toed shoes
- No lose clothing
- Safety glasses are to be worn
- Shop coats are to be worn
- If you do not know how to use shop equipment - ASK.
- THINK first.
- Additional rules will be posted in the shop or expressed by Ken.

Failure to safely work in the shop may lead to lost shop privileges. This is likely to have academic consequences.

Lab Time Layout - ENGG*2100 - Fall 2009

Week		Th	Fri	Tues		Design-Build Project Shop (Rm 1170) & Design Lab (Rm 1103) 2:30 - 3:55 (except "B" groups)	CAE Task Computer Lab (Rm 1135) 3:55 - 5:20	"Due" at Beginning of the Lab unless otherwise noted	
								Design Build	CAE
1	Sept	10	11	15		**Shop** CAE reverse engineering DB Team forming	CAE Intro Skills	Team Data	
2	Sept	17	18	22		**Shop** CAE reverse engineering DB Questions	CAE Base Skills Database		"Quiz"
3	Sept	24	25	29		**Shop** CAE part assignment / material ID Learning Styles, Idea Feedback	2D Drawings	Submission #1 Twelve Ideas	Part Base Data (5:30pm)
4	Oct	1	2	6		**Design Lab** Coaching on Analysis	Assembly, Mini-Simulink	Submission #2 Best Three	"Quiz"
5	Oct	8	9	13		**Design Lab** Team reflection	CAE Support Powerpoint		2D Drawing, Material Identification
6	Oct	15	16	20		**Design Lab** Presentation #1	CAE - FEA for ENGG*2120	Presentation #1 & Submission #3 Chosen One	
7	Oct	22	23	27		**Shop & Design Lab** Coaching Final Design work	MatLAB/Simulink for ENGG*2400	**Be prepared to use Shop time**	
8	Oct	29	30	Nov 3		**Shop & Design Lab**	3D support		
9	Nov	5	6	10		**Shop & Design Lab**	3D presentation & submission		3D Submission & Evaluation
10	Nov	12	13	17		**Shop & Design Lab**	Assembly & Design-Build Dwgs Support		
11	Nov	19	20	24		**Wind Tunnel** Design Project Presentations & Dwg Evaluation	CAE Assembly work	Product testing & Dwgs	
12	Nov	26	27	Dec 1		**Final Report Submission**	CAE Assembly Assessment	Final Report & Dwgs	CAE Assembly Submission, Presentation & Evaluation

Each lab section is split into A & B halves.
The "A" group will start in the Design space (Shop or Rm 1103) each week and switch to the Computer lab (Rm 1135) at 3:55pm.
The "B" group will start in the Computer lab (Rm 1135) each week and switch to the Design space (Shop or Rm 1103) at 3:55pm.