



# Faculty of Engineering Engineering Design and Innovation

Never Stand Still

Faculty of Engineering

## **ENGG1000**

# **ENGINEERING DESIGN AND INNOVATION**

## **Course Outline**

**Semester 1 2016**

Chris Daly

Course Co-ordinator

This outline informs you on how this course will be run.

**If you need more help...**

Ask at the School that you are enrolled in  
or ask at the Engineering Student Centre

Once you are enrolled, the Moodle Learning Management site has more  
specific information for this course

<http://moodle.telt.unsw.edu.au/>

### Quick-start To-Do List

When	Action	Location
Monday Week 1 (Mon 29 <sup>th</sup> February , 2:00pm)	Attend Introductory lecture	As per your class timetable (see my.unsw.edu.au)
Thursday Week 1, 3 <sup>rd</sup> March: 2pm or 3pm <b>as allocated in first lecture</b> – see Moodle if lost!	Participate in Impromptu Design activity <b>(this activity is assessable)</b>	Various locations and one of two times as allocated in Intro Lecture, and in Moodle or meet outside Engineering Student Centre before 2pm if lost
Before 11.55PM Wednesday 9 <sup>th</sup> March (Week 2)	Finalise your decision on the project you want to select; if you make a mistake contact your project coordinator (Page 4)	Via Moodle
Monday Week 2 (Mon 7 <sup>th</sup> Mar, 2:00pm)	Attend lecture on Impromptu Design <b>(includes details of an Assessable task)</b>	As per your class timetable (see my.unsw.edu.au)
Thursday Week 2 and onwards 10 <sup>th</sup> March 2pm	Join the School corresponding to the project you have chosen	See timetable on Moodle website (check for changes)

## Course Staff

The course is coordinated by the Faculty of Engineering; most of it will be run by the schools within the Faculty plus Materials Science and Engineering in the Faculty of Science.

### *Course Convenor for the Faculty*

Dr Chris Daly  
 Location: Room OMB 152  
 Phone: 9385 4514  
 Email: [c.daly@unsw.edu.au](mailto:c.daly@unsw.edu.au)

### *Contacts for the ten schools that are running projects in this course*

School	Coordinator and contact details
Chemical Engineering	Dr Kondo-Francois Aguey-Zinsou <a href="mailto:f.aguey@unsw.edu.au">f.aguey@unsw.edu.au</a> Room F10-418 ph 9385 7970
Computer Science and Engineering	Professor Claude Sammut <a href="mailto:claudes@cse.unsw.edu.au">claudes@cse.unsw.edu.au</a> Room K17-401J ph 9385 6932
Civil and Environmental Engineering	Dr Mitchell Harley <a href="mailto:m.harley@unsw.edu.au">m.harley@unsw.edu.au</a> ph 8071 9822
Electrical Engineering and Telecommunications	Dr Alex von Brasch <a href="mailto:a.vonbrasch@unsw.edu.au">a.vonbrasch@unsw.edu.au</a> Rm EE338, ph 9385 4933
Graduate School of Biomedical Engineering	Dr Ross Odell <a href="mailto:r.odell@unsw.edu.au">r.odell@unsw.edu.au</a> Room F25-507 ph 9385 3920
Materials Science and Engineering	Dr Sean Li <a href="mailto:sean.li@unsw.edu.au">sean.li@unsw.edu.au</a> Room E8-217 ph 9385 5986
Mechanical and Manufacturing Engineering	Dr Chris Menictas <a href="mailto:c.menictas@unsw.edu.au">c.menictas@unsw.edu.au</a> Room J17-402F ph 9385 6269
Mining Engineering	Dr Chris Daly <a href="mailto:c.daly@unsw.edu.au">c.daly@unsw.edu.au</a> Room OMB 152 ph 9385 4514
Petroleum Engineering	Dr Peter Neal <a href="mailto:peter.neal@unsw.edu.au">peter.neal@unsw.edu.au</a> Room TETB-248 ph 9385 4261
Photovoltaic and Renewable Energy Engineering	Dr Stephen Bremner <a href="mailto:spbremner@unsw.edu.au">spbremner@unsw.edu.au</a> Room EE-105 ph 9385 7890

## Course Information

### *Course Credit Value*

This course is 6 units of credit.

Units of credit indicate the nominal workload for students. The normal workload expectations at UNSW are 25-30 hours per session for each unit of credit; including class contact hours, preparation and time spent on all assessable work. For a six unit of credit course with no formal examinations, like ENGG1000, this means a typical average total workload of 11 to 13 hours per week.

### *Course Organisation*

This course is coordinated by the Faculty of Engineering which also arranges some common lectures. Most of the course is run in conjunction with 1 of the 13 projects offered by schools of the Faculty of Engineering and the Faculty of Science (Materials Science and Engineering). Learning activities will vary a little between projects. Although there are differences in presentations, the course is coordinated to ensure equivalence. All the projects are done in groups of usually 5 to 8 students plus a mentor. Group size varies with selected project.

**You may select any of the projects, independently of your preferred field of study. It is not mandatory to undertake the project associated with your chosen discipline. This is a common engineering course!**

### *Project Selection*

**Project selections are to be finalised by 11:55PM on Wednesday 9<sup>th</sup> March.** Descriptions of each of the projects are attached to this outline. You will be given more information to help you finalise your project selection during the first Faculty lecture in Week 1 of the course. Full project descriptions and course outlines are available on Moodle. **Make sure you are certain of which project you wish to enrol in before committing yourself to the online selection option.**

### *How this Course Fits with Others in your Program*

This course looks at what it means to be an engineering designer. You will see the big picture and how all your studies, such as mathematics and science, fit together. It will also look at some of the non-technical issues which are just as vital to a successful engineering career as the technical ones.

You will study and experience Engineering Design as a multi-faceted activity, which requires considerable creativity, as well as judgement, decision making and problem solving skills. You will see the need to take context into account and be able to complete design projects on time and within budget. The problem solving and project management skills that you learn in this course will be invaluable for later courses in your degree, in your career and for life in general.

### *Learning and Teaching Philosophy*

This course is, first and foremost, an exercise in experiential learning, with emphasis on reflection on the design process. You will work together in teams to design a solution to a specified but open-ended problem. This project will be supported with a variety of additional student experiences to help you acquire individual and group skills in areas needed for communicating the design, including graphical representation, collaboration, report writing and any necessary discipline-specific knowledge.

### *Aims*

1. Introduce you to the principles and methods of engineering design.
2. Involve you in hands-on design and engineering projects.
3. Help you gain skills in written expression.
4. Introduce you to the way a professional engineer works.
5. Provide a team-based environment so you can experience and learn collaborative skills.
6. Help you learn the professional use of information resources.

### ***What you are Expected to Learn***

After you have completed this course, you will be expected to have the following capabilities.

- Be familiar with the process of engineering design and the use of design methods for defining an open-ended design problem, generating alternative conceptual solutions, evaluating these solutions and implementing them.
- Understand the basic elements of project management and be able to plan and schedule work activities in accordance with standard practice.
- Understand the dynamics of collaborative teams and how to work effectively within a team to accomplish tasks within given deadlines.
- Be able to organise, conduct and record engineering meetings.
- Be able to effectively convey your thoughts and ideas in an engineering design report.
- Be able to understand the issues of quality, safety, diversity and equal opportunity as they apply to university and professional life.
- Understand some of the roles and responsibilities of a professional engineer.

### ***Teaching Strategies***

Teaching in this course is centred on the project. For example, you will develop communication skills by communicating about the project; you will develop teamwork and project management skills in the context of your project team; and you will experience the kinds of technical problems resolved by engineers in your selected project area.

How this will work out in detail will depend upon the particular school presenting a particular project. You will receive a separate handout describing this once you have finalised your choice. If you want to see details earlier, refer to the Moodle site for this course.

### **Learning Outcomes and Assessment Framework**

ENGG1000 has been designed to ensure there is equivalence and alignment between the various School's implementation of the course. Each School operates within an agreed framework of learning outcomes as indicated in the following table.

<b>Learning Outcome</b>	<b>Weight</b>
Development of engineering design skills for creative solutions to open ended problems	30% - 50%
Communication skills in technical report writing, graphical communications and experience in public presentation.	30% - 50%
The development of teamwork and project management skills	10% - 30%
Information gathering and evaluation skills to support the design process.	10% - 30%
School-selected discipline knowledge component	0 - 20%

Full details of each School's specific assessment activities and their weightings are provided in the project outlines available on the Moodle site. You are encouraged to preview these and download them for future reference.

**Because of differences between each School's specific learning and assessment activities it may be necessary to moderate adjust marks (up or down) to ensure fairness. This will be undertaken after all the results are available at the end of the semester and by a representative panel of the Faculty.**  
**Academic Honesty and Plagiarism**

According to the UNSW website [www.lc.unsw.edu.au/plagiarism](http://www.lc.unsw.edu.au/plagiarism)

Plagiarism is taking the ideas or words of others and passing them off as your own. Plagiarism is a type of intellectual theft.

Plagiarism happens for a number of reasons—one is because some students decide consciously to gain credit for the work of others. However, most incidents of plagiarism are the product not of deliberate cheating, but of underdeveloped academic skills.

This course will be an important opportunity for you to develop skills in writing and referencing your sources so that you avoid plagiarism. Look at the website above for help, or see the resources available through The Learning Centre.

A standard UNSW statement on plagiarism is given below.

#### **What is Plagiarism?**

Plagiarism is the presentation of the thoughts or work of another as one's own.\* Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor;
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

[www.lc.unsw.edu.au/plagiarism](http://www.lc.unsw.edu.au/plagiarism)

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

\* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle

† Adapted with kind permission from the University of Melbourne.

## General Course Schedule

Shaded items below are Faculty-wide activities

Week	Monday	Thursday
1	Introductions and project descriptions	Impromptu Design (everyone, assessable)
2	Review Impromptu Design including assessable task	School based projects commence. Refer to your School Course Outlines for Timetable
3	project activities in Schools	project activities in Schools
4	project activities in Schools	project activities in Schools
	Term Break	Term Break
5	project activities in Schools	project activities in Schools
6	project activities in Schools	project activities in Schools
7	project activities in Schools	project activities in Schools
8	project activities in Schools	project activities in Schools
9	project activities in Schools	project activities in Schools
10	project activities in Schools	project activities in Schools
11	project activities in Schools	project activities in Schools
12	project activities in Schools	Celebrate!

## Times and Rooms

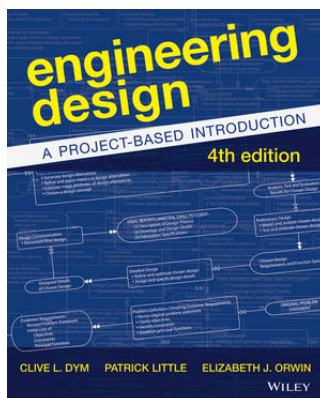
Dates, times and rooms for common Faculty activities are given below. Dates, times and rooms for the project that you select (Thursday, Week 2 onwards) are available via the Moodle site.

**NOTE: Clancy Auditorium/CLB 7 (depending on your timetable) is for Monday weeks 1 and 2 only. All other times you will be somewhere else depending on your choice of project. Timetables will be available via Moodle so please check them before the end of week 1.**

## Resources for Students

The eLearning Moodle site for this course is a vital and integrated part of the learning environment. eLearning is the web-based learning environment at UNSW. You can access eLearning via <http://moodle.telt.unsw.edu.au> and select Login to Moodle using your zPass.

The recommended text for this course is:



Dym, Clive L., Engineering Design A Project Based Introduction.  
It is available as a text and as an accompanying eBook from the Bookshop.



You should have access to a copy as it provides useful reading on a number of relevant topics. There are copies available for purchase from the University Book Store and available in the University Library Reserved Collection. The coordinator of your selected project will tell you if alternative or additional textbooks are recommended. References specific to a particular project are given in the School outlines that will be supplied after you have finalised your decision and may be previewed on the eLearning site for this course.

### **Continual Course Improvement**

Engineering Design is a team effort and we are particularly interested in your feedback. We want your suggestions of what is good and should be retained, and what is not so good and should be improved (with ideas on how to do it). In addition to the standard UNSW Course and Teaching Evaluation and Improvement (CATEI) surveys we will be asking for your feedback in other ways during your studies. Do make attempts to communicate constructive feedback to your lecturers. Feedback on particular tasks are often requested during the course.

### **Administrative Matters**

For most of you this will be your first session at UNSW. We are a large, complex organisation and you will have much to become familiar with. Take time to review the documentation on processes and procedures that you will have received at enrolment and from your School. Additional Administrative Matters documentation for this course will be posted on the Moodle site.

#### *Expectations of Students*

UNSW expects regular attendance at lectures and tutorials/laboratory classes/seminars. Although exceptions may be made for special circumstances, we do expect University commitments to take precedence over regular work activities, holidays etc.

UNSW has rules for computer use, for example, for email and online discussion forums. You will have to agree to them when you first access the UNSW network.

We expect everyone – staff and students – to treat each other with respect.

### **Procedures for Submission of Assignments**

Instructions will be supplied by the School concerned during lectures and within the respective course outlines.

### **Occupational Health and Safety**

Like the wider community, UNSW has strict policies and expectations on Occupational Health and Safety and you should read these. They may be accessed on:

<http://www.gs.unsw.edu.au/policy/ohspolicy.html>

Your School will also have policies that you should get to know and follow.

### **Examination Procedures and Advice Concerning Illness or Misadventure**

There are no formal examinations in this course. However, if you find that your performance in an assessable component has been significantly affected by illness or other unexpected circumstance, then you should make an application for special consideration as soon as possible after the event by visiting UNSW Student Central. Talk to your course convenor too. Note that considerations are not granted automatically.

### **Equity and Diversity**

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or [www.studentequity.unsw.edu.au/](http://www.studentequity.unsw.edu.au/)). Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

## My eLearning Enrolment Information for ENGG1000

Once you have read this booklet and decided upon a project that is of interest to you, you can then visit Moodle's ENGG1000 course module to commence the project selection process.

It's recommended that you have a look at the **Course Videos** first to get an idea of how the course runs. Other videos are available via <http://www.youtube.com/> Search on ENGG1000 for a number of short videos on completed projects. The next step is to go into the **Project Description and Selection Document on Moodle** and research the various projects that are available. When there is no doubt in your mind which project you want to do, click on the signup tool icon. You may select any of the projects, independently of your preferred field of study. It is not mandatory to do the project associated with your chosen discipline. **If you make a mistake please contact the Faculty Course Coordinator via the email address given at the beginning of this outline.**

## Introduction to the Projects

### Why Projects?

We want you to experience the engineering design process as well as hear about it and reflect upon it. So, in this course you will learn by doing; by working on tasks connected with a project.

Performance of your design will be one important part of the assessment, the other marks will be awarded for process (what you do) and your reflection (thinking about and showing that you have understood what you do).

### Range of Projects and Project Selection

Projects fall within the topic areas listed below. Some areas have more than one project. You may choose a topic in any area, irrespective of the program you are enrolled in. **All selections are subject to quotas. Selections may be changed on-line up to the end of week 2. Changing after that is not recommended because project activities will have begun. For exceptional circumstances please contact the relevant School coordinator.**

Topic area	Project title(s)
Chemical Engineering	Energy Storage for Sustainable Transport
Computer Science and Engineering	Robo Rescue
Civil and Environmental Engineering	Project 01: Progressive Collapse of Building Structure Project 02: Seismic Response Project 03: Wave Energy from the Oceans Project 04: DIY Aerial Mapping System
Electrical Engineering and Telecommunications	Smarter Cars
Graduate School of Biomedical Engineering	Bionic Hand
Materials Science and Engineering	Advanced Application of Shape Memory Effects
Mechanical and Manufacturing Engineering	Project METS
Mining Engineering	Mars Regolith Collection
Petroleum Engineering	Geological storage of greenhouse gases
Photovoltaic and Renewable Energy Engineering	Space Elevator

Chris Daly  
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