

UNSW
GSOE9510
Term 1 2020

Ethics & Leadership in Engineering: the Students' Guide

Welcome to GSOE9510!

Have you ever thought what it involves to be an engineer with whom other people will want to work? This course explores that question, considering the behaviours that we engineers| indeed, any person| should choose when working in a team, considering sustainability, managing risks, or delivering a project which affects others. And we will also get to know more about each other a bit more.

Course Staff

Course convener: Dr I. Skinner, i.skinner@unsw.edu.au.
You will also have other class-room teachers.

Consultations: Students are encouraged to use the on-line discussion tools found on the course moodle-site.

Matters concerning course *content & administration* should be referred to the convener. Class-room teachers have responsibility for arrangements within their respective classes.

Course details

Units of Credit: GSOE9510 is a 6 UoC course; GSOE9510 is a 6 UoC course; we emphasize that 6 UoC means 6 UoC: the *indicative student workload is 150 hr*, i.e. 13 hr/wk, allowing some time for exam and preparation. Of course, the amount of work you actually choose to do depends upon your ambition and your ability.

Classes: This term, GSOE9510 has 2 classes running most weeks, a 'lecture' and a tutorial.

You will find a detailed class schedule on moodle.

You will find a detailed class schedule at timetable.unsw.edu.au/2020/GSOE9510.html

Course Information

Context and aims

This course is part of the non-technical component of your professional education.

Aims: *This course is primarily designed to enhance your ability to (i) analyse ethical problems, determine a plan of action, and articulate this resolution to others, and (ii) make decisions about technological innovations and, thereby, to engage productively in the leadership of various groups.* In both cases we are primarily interested in the context of engineering, but the skills apply equally to your wider life.

A further expectation is to provide you with (i) an understanding of the complex, interlocking organisations that form the wider, non-technical context in which engineers practice, and (ii) some practical guidance both for interacting professionally with other engineers, wherever they might be, and for conducting yourselves as engineers, especially within large organisations under strong commercial pressures. Ethical analyses will be specifically informed by formal guidance from Engineers Australia (2010).

Prerequisites & assumed knowledge: There is no prerequisite for this course but we assume that you have worked previously on an engineering project of some description.

Learning outcomes

After the successful completion of this course, the student will be able to

- describe the social, environmental, regulatory, & organisational context of engineering and identify which of its features are important for an engineering design;

- identify ethical problems, particularly in the context of engineering practice;

- formulate and communicate consistent, coherent responses to such problems, using the formal language of ethics, and critically examine the ethical arguments proposed by others;

- use different criteria, including aspects of sustainability, to evaluate technological innovations;

- help lead, i.e. facilitate the effective working of, a team (be it a technical project team or those involved in using an innovation); and

- identify ways to assess and reduce risks, especially those associated with human limitations.

In summary, we expect you will improve your ability to consider problems from *multiple perspectives* and make decisions associated with *uncertain, inconsistent and imprecisely defined* requirements, as is often the case when *people are involved*.

Appendix 1 explains how these relate to wider program graduate outcomes.

Additionally, students are expected to improve their skills in gathering and synthesising information, in the oral and written presentation of arguments, in listening, and in working with other people, some of whom will have ideas and beliefs very different from your own. It is clear these objectives can be met only when students actually engage in discussing and debating (both written and oral) the course of action which should be followed, i.e. the 'best' decision.

Teaching strategies

homework exercises (12.5) and class contributions (i.e. participation) (12.5). The moodle-based work comes from two group deliverables | a learning resource (10) and a simulation project (12) | and your participation in moodle-based discussions (3).

Your final, summative course mark m is given by

$$m = x + y:$$

However, if $x \geq 22$, then you will get a UF grade. In other words, *you must get a satisfactory*

its success in the game. After the game concludes, you will be required to write a short *individual* reflection statement about how it went. Full details of this task's requirements are in separate documents.

Any student who is repeating this course will participate in a different project (so that the game is not spoiled for others).

Online Learning Resource: Your team (same team as above) will also develop an on-line learning resource for the class, based on an assigned reading relevant to this course. This resource is expected to use the ideas explored in this reading and, of course, the learning objectives of this course. The format of this resource is at the discretion of the team. Teams are also required to reply to any questions that will be asked on moodle in response to its resource, though you are not necessarily expected to have the definitive answer. Additionally, you, as an individual, must ask questions about TWO resources produced by other teams. The resource for a typical chapter is expected to take a typical student only 15 minutes to work through. A few readings are longer and will be given to larger teams. The resulting resource will, of course, be longer in this case. Full details of this task's requirements are in separate documents. The chapters for the learning resources will be allocated to teams by Wed Week 2. *All learning resources are due Wed Week 6.*

Table 1 Critical dates for student work.

<i>date</i>	<i>activity</i>	
Week 2	Mon	team memberships completed
Week 2	Wed	resource chapters received
Week 2	Thu	play Round 1 of simulation project
Week 3		homework 1 submitted
Week 6	Wed	submit learning resource
Week 6		homework 2 submitted
Week 8	Thu	class-test
Week 9		homework 3 submitted
Week 10	Fri	complete team project reflection questionnaires
<i>tba</i>	exam	

Team membership: To form teams, you need to select a team using the team membership selection tool in moodle. *You will be in the same team for both the Key Reading and the Simulation Projects.*

Note these general considerations about your assessment.

- (i) All assessed tasks will be graded according to the academic merit (see nominated learning objectives) of the individual piece of work.
- (ii) Being able to formulate and ask appropriate questions is an important skill and, where relevant, marks are influenced by the quality of the questions you raise.

(iii) Marks are also influenced by your ability to communicate your ideas clearly and concisely.

In all assessment tasks, you should read the instructions and pay attention to formal requirements detailed on any relevant cover-sheet. There is a standard penalty for late submission of a task: $\text{given-mark} = \text{raw-mark} \times 0.8^n$, where n is the number of days late.

Course Schedule

Please confirm the schedule on moodle, where it can be kept up-to-date.

Resources for Students

As mentioned above, 'lecture notes' will not be distributed. However, you will get some notes associated with the key ideas.

Books

Books are expensive. There is no single prescribed textbook set for this course. Instead, we have identified some excellent reference books that will support your learning.

Martin & Schinzinger (1996) covers the essential material about ethics, and relates this to engineering practice. The aspects related to leadership are supported by Northouse (2007), which is not specific to engineering. A reference generally useful, and also set in the context of (albeit civil) engineering, is Beder (1998).

There are many, better written and more entertaining books that pose significant, timeless ethics issues in works of fiction, and yet relevant to engineers, e.g. Asimov (1950), Clarke (1965), Shelley (1818), Stevenson (1886), and Orwell (1949). Likewise, engaging writers (not those of textbooks) have explored the nature of leadership, organisations, and

On-line resources

Additional on-line resources relevant to these courses:

The Library: info.library.unsw.edu.au/web/services/teaching.html

The Learning Centre: www.lc.unsw.edu.au

There **is** a wealth of case studies related to engineering ethics on The Web. We encourage you to explore it, and think about what you find. Do you agree with it? Why? Likewise, on The Web, there is plenty of free advice about leadership and strategies. Be aware, though, that much of this is in the context of businesses.

We invite students who find suitable material, including web-sites, to highlight these to others using the moodle discussion tools.

The Learning Centre

The Learning Centre is located in the new 'Learning and Careers Hub' on the Lower Ground Floor of Morven Brown, opposite CLB. It provides free and confidential academic support services for students, including assistance with communicating information in both written & oral forms. Given the nature of assessment tasks in this course, you may find this useful. You can approach the Centre directly for assistance on an individual (or group)

there was a serious problem which we couldn't know about and no-one informed us until it was too late to do anything.

Topics and activities are continually revised in response to student feed-back.

Advice on how to succeed in this course

- (i) Learn the key principles so that you can identify ethical issues or problems with teams and engage in debates. Working through the resources is an excellent way to start, but only a start.
- (ii) Practise these skills in discussions, and not only in your designated tutorial times. Listen to others.
- (iii) Complete all the assessment tasks at the appropriate time, to the required specifications.
- (iv) Above all, make sure you are enjoying yourself and finding points of interest, for then

Kotter, J.P. 1990, *A Force for Change*, Free Press, New York

Learning Centre (UNSW) 2010, *The Learning Centre Welcome*, [online] available: www.lc.unsw.edu.au [accessed 4 Dec 2019].

Lee, A. nd, *Guidelines on Learning that inform Teaching*, [online] available: www.guidelinesonlearning.unsw.edu.au [accessed: 4 Dec 2019]

Machiavelli, N. 1532, *Il Principe* (English translation: *The Prince*), ::: Florence.

Martin, M.W., & Schinzinger, R. 1996,