ELEC4122
Strategic Leadership & Ethics

ELEC4011
Ethics & Electrical Engineering Practice

provisional COURSE INTRODUCTION — session 2, 2008

Course Staff

Course convener: Dr I. Skinner, room EE335, i.skinner@unsw.edu.au
There will also be tutors.

Consultations: Students are encouraged to use the discussion tools on WebVista.
As each tutorial group is autonomous, any questions related to tutorials should be directed to
your tutor.
Matters concerning course administration should be referred to Dr Skinner.
All questions about the Industrial Training requirements should be addressed to Dr Epps or Dr
Ramer.

Course details

Units of Credit: ELEC4122 is a 6 UoC course; the indicative student workload is 150 hr
(i.e. 12 hr/wk), spread over the session. ELEC4011 is only 3 UoC and so has half that notional
workload. Of course, the amount of work you actually choose to do depends upon your ambition
and your ability.

Contact hours: ELEC4011 has 4 timetabled hours; ELEC4122 has 5. Currently timetabled
classes are listed below. All classes run in Week 1.

<table>
<thead>
<tr>
<th>Class</th>
<th>Days</th>
<th>Time</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>plenary class [2 hr]</td>
<td>Monday</td>
<td>12–2 pm</td>
<td>CLB8</td>
</tr>
<tr>
<td>tutorial-seminar [2 hr]</td>
<td>Monday</td>
<td>2–4 pm</td>
<td>Law302</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3–5 pm</td>
<td>QuadG048</td>
</tr>
<tr>
<td></td>
<td>Tuesday</td>
<td>12–2 pm</td>
<td>QuadG048</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4–6 pm</td>
<td>Quad1049</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>9–11 am</td>
<td>Law301</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2–4 pm</td>
<td>Law301</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4–6 pm</td>
<td>Law302</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>12–2 pm</td>
<td>Quad1045</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2–4 pm</td>
<td>Law302</td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>1–3 pm</td>
<td>Quad1048</td>
</tr>
</tbody>
</table>

4011&4122/course outline at 4 Jul p. 1/14
tutorial-activity [1 hr] Tuesday 9 am QuadG031
(ELEC4122 only) 12 noon Webst256
2 pm ME301
4 pm QuadG031

Given when this course outline needed to be written, this list of tutorial classes must be considered provisional.

You will have enrolled in a tutorial group; you must attend this group all session.

There will be a total of 28 contact hours arranged for ELEC4011 and 48 hours for ELEC4122. There will be a plenary class every week. Some weeks this will be only of 1 hr duration. Some weeks (e.g. Week 2) this class will not be relevant to ELEC4011’s learning aims and objectives. These differences are explicitly shown in the lecture schedule below. However, please note that, depending upon the availability of our guest speakers, the schedule for these lectures may vary. There will be 11 of the 2-hr tutorials (seminar); you get one week off. For Monday’s classes this is necessarily Week 10; for Friday’s, Week 12.
There will be 8 of the 1-hr tutorial classes. At the moment, we have scheduled activities on Tuesdays in Weeks 1, 2, 4, 6, 7, 8, 11 and 12, but this, too, may vary.

Course Information

Context and aims

This course is the final, formal step in the non-technical, professional part of your undergraduate education. It also involves the Industrial Training requirement, as specified by IEAust.

The course ELEC4122 is composed of Parts E and S (described below); ELEC4011 is only Part E.

Aims: Part E is intended to enhance your ability to analyse ethical problems, determine a plan of action, and articulate this resolution to others, primarily in the context of engineering, but also in your wider life. A further expectation is to provide some practical guidance for practising engineers, especially those working in large organisations under strong commercial forces. The ethical analysis will be specifically informed by the formal guidance provided by the Institution of Engineers (IEAust, 2000).
Part S is designed to enhance your ability to both make decisions about technological innovations and engage productively in associated leadership, again primarily in the context of engineering. Also, it is expected to provide you with an understanding of the complex, interlocking organisations that form the wider, non-technical context in which engineers practice and some practical guidance on how to interact professionally with other engineers, wherever they might be.

Relation to other courses

This course is part of the fourth year core of your BE program of study. ELEC4122 is not a course about project management (studied in ELEC4010/4120); nor is it a course about business strategies and intellectual property (studied in ELEC4445).
Pre-requisites: The pre-requisite for this course is successful completion of 120 UoC of study.

Assumed knowledge: n/a

Following courses: n/a

Old courses: Part E is equivalent to the old course ELEC4011.

Learning outcomes

After the successful completion of Part E, the student will be able to

- comprehend and critically examine ethical arguments;
- identify ethical problems in an engineering context;
- formulate and communicate consistent, coherent responses to them, using formal frameworks;
- describe important aspects of the social & environmental context of engineering; and
- explain details of an engineer’s rights and responsibilities.

After the successful completion of Part S, the student will be able to

- describe technocratic decisions and some processes used to make them;
- identify different ways to evaluate technological innovations, including aspects of sustainability;
- use formal frameworks for making decisions involving uncertainty;
- betrter facilitate the effective work of a team;
- identify ways to reduce risks, including those associated with human failings;
- recognise the role of the legal system in protecting property and apportioning liability; and
- describe important aspects of the regulatory and organisational context of engineering.

Additionally, in both Parts, students are expected to improve their skills in gathering and synthesizing information, in the oral and written presentation of arguments, in listening, and in working with other people, some of whom will have beliefs very different from your own. It is clear these objectives can be met only when students actually engage in arguing (both written and oral) about the answers to questions.

These courses’ contents and learning activities address a number of UNSW’s graduate attributes (UNSW 2003).

#2 An in-depth engagement with the relevant disciplinary knowledge in its interdisciplinary context.
The formal syllabus explores engineering in its interdisciplinary context.

#3 The capacity for analytical and critical thinking and for creative problem solving.
The core learning outcome is that you can analyse poorly articulated problems and work your way to a ‘best’ resolution.
The ability to engage in independent and reflective learning.
This is addressed by having you read materials instead of attending traditional lectures.

Information literacy – the skills to locate, evaluate and use relevant information.
This is addressed as you evaluate and identify the information relevant to the problems you deal with in tutorial-based tasks.

An appreciation of, and respect for, diversity.
This is part of your developing ethical awareness; you will learn about other people’s perspectives.

The skills required for collaborative and multidisciplinary work.
This is addressed by several group-based tasks.

A respect for ethical practice and social responsibility.
That this is addressed is obvious!

The skills of effective communication.
These are developed by the oral presentations, and some of the in-session activities for ELEC4122 and the formal report for ELEC4011.

Teaching strategies
Both ELEC4011 and ELEC4122 consist of the following elements: “lectures”, student presentations, other tutorial-based activities, and self-paced learning.

Self-paced learning
This is not a conventional lecture course. Rather than having a full set of traditional instructional lectures, both these courses are structured as reading courses. This means that you will discover the core material of the course by reading the prescribed material, instead of at lectures. It is an important professional skill to be able to search through information and identify what you need. Being able to discipline your own learning will stand you in good stead for the rest of your lives.

Of course, no lecture notes will be handed out, but you will receive suggested readings. For Part E, a reading guide for the reference text Martin & Schinzinger (2002) can be found on the WebVista site. For Part S, relevant reading material will be given to you as we complete different, structured activities during the session.

Lectures
Nevertheless, students are expected to attend the lectures. In the earlier ones, you will be introduced to the main themes of the course and provided with some motivation. Later in the session, we will have some visitors who will discuss specific topics, set in a specific context.

Student presentations
The student presentations are not only to foster your communication and teamwork skills; they require you to identify ethical problems and argue their resolution. This is true whether you are presenting or listening. You will be actively engaged in meeting the learning objectives of Part E while exploring questions identified by yourselves.
Tutorial activities

The other tutorial activities are there to allow structured reflection on the ideas explored during the course. They will afford you the chance to share your understandings and experiences with each other. Once again you will practise key skills. The syllabus of these courses is not such that you can learn without active engagement with other people.

Note that these ‘teaching strategies’ are supported and guided by *Guidelines on learning that inform teaching at UNSW* (UNSW 2006). In particular, these guidelines specify [p 6] “five broad categories: engaging students in learning; contextualising students’ learning experience; creating an inclusive learning and teaching experience; designing an engaging, contextualised, and inclusive curriculum; and teaching an engaging, contextualised, and inclusive curriculum.”

Be assured that you will find this course more fun than you initially expect. Every year students are different but every year it is a pleasure to see them get passionate & care about something. Whatever else, make sure you *ENJOY YOURSELF*. We enjoy this course, too.

Assessment

There are several components for the assessment in these courses, as detailed in Table 1.

<table>
<thead>
<tr>
<th>assessment task</th>
<th>4122 weighting</th>
<th>4011 weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>final exam*</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Week 11 test; Week 12 writing*</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>2 seminar presentations</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>2 hr tutorial-seminar participation</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>1 hr tutorial-activity participation</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>formal written report</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>on-line teamwork task</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>assignment task on visitors</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>own choice task</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1 *Assessment weightings*

Students must get a satisfactory mark from the subset of tasks indicated with *.

*Students in ELEC4011 must get a satisfactory mark for the final exam, to pass this course.*

*Students in ELEC4122 must get a satisfactory mark for the final exam combined with the Week 11 & 12 activities, to pass this course.*

If not, the grade UF will apply to what would be, otherwise, a passing mark.

All assessment tasks’ due dates are given below.

**Final examination:** The written examination at the end of session will be of 2 hr duration. It will test critical thinking and general understanding of the course material in a controlled setting. For ELEC4122 it will be an open-book exam; for ELEC4011, closed-book.
4122 Week 11 test: This closed-book test will test your basic knowledge of the core ideas of the course, and will take the form of short answer questions.

4122 Week 12 reflective writing: This written task requires you to think about the overall implications, of what was studied in the course, for your personal, professional practice as an engineer.

Seminar presentations: You will participate in the presentation of two seminars as part of a group of 4 students. You can express preferences to help us organise the groups. To do this, you must complete & submit the Seminar Group Preference Form (grey, attached to this hand-out) by 2 pm Wed 6 Aug. The allocation of topics & the groupings of four students per group will be announced in your classes in Week 3, and be available on WebVista.

In these presentations, the group is expected to explore the ethical implications of the topic. This necessarily involves a clear statement of the questions to be answered. There should be perspectives from various ethical viewpoints that could be adopted to answer your questions. Conclusions must be attempted. Students are expected to research their topics. Presentations are expected to last about 45 minutes. The balance of the class will be general discussion. Full details of this task’s requirements are in a separate document.

Tutorial participation: You are required to participate in your respective tutorial classes. This means working on the activities, actively listening and appropriately contributing to discussions, not simply being physically present. There will be no marks given for mere presence. If you do not do these things, you will not learn what we expect you to learn this session, notably how to respond when asked a question.

If you do not have a formal, acceptable explanation for missing a class, your participation mark will be reduced.

4011 formal report: ELEC4011 students are to submit a formal written report containing a discussion of the ethical issues associated with a topic related to engineering; it must consider both sides of any argument; it must clearly identify your conclusions about the issues and why you reached them. The report requires discussion of your topic using the formal frameworks for ethical reasoning, introduced in the course. It requires you to do some research. The main body of the report (including introduction & conclusion) should be 1600 to 2000 words. Full details of this task’s requirements are in a separate document. This report is due at 2 pm 8 October, which is Wednesday Week 10.

4122 teamwork task: ELEC4122 students will have an activity causing them to reflect on the way their seminar group operated, in the context of team leadership. This will be a series of simple questions related to the context of team leadership. This will commence after you have presented your first topic, and must be completed by the end of Week 12. Full details of the task are in a separate document.

4122 own choice task: ELEC4122 students are to complete a self-nominated activity that demonstrates their successful meeting of the learning objectives. This can be the work of an individual or a team; it can take any form: a traditional written report, an oral presentation, a piece of drama, etc. Note, though, that there is only a limited amount of time available, if you
wish to book a presentation. Your nominated task must get prior approval from Dr Skinner, who will consider (i) the scope of the task against its assessments weighting (10 %), (ii) how the proposal meets the nominated objectives, and (iii) the number of people involved. As an indication of what is possible, consider the specifications of the formal report in ELEC4011. This is for 10 % of an individual’s 3 UoC. Full details of this task’s requirements are in a separate document. It is due at the end of Week 12, though may be completed any time before then. The proposal (your tender) must be submitted by Wednesday 3 Sept (Week 6), but we encourage you to get the negotiation started sooner.

4122 visitor assignment: For ELEC4122 students, there is a visitor assignment that will cause you to reflect upon both what a guest lecturer has said and its relationship with the learning objectives of the course. (The 6 guest lecturers are indicated in Table 2.) You are required to write an examination question that would be based on those learning objectives, and the lecture of a guest, such guest being of your own choosing. The question should be designed to be completed in 15 mins and be accompanied by a marking guide and an explanation of why you think the question is fair, i.e. how it provides for a measurement of a student’s engagement with the learning objectives. (No, not all of them in one question!) Full details of this task’s requirements are in a separate document. It is due at the end of Week 12, though may be submitted any time before then.

Industrial training: Until you submit your report on industrial training, your mark for this course cannot be finalised. If you have passed this course, but not completed your industrial training, then your mark will remain as PE. The requirements for your industrial training and the associated report are available from the Faculty Office (Faculty of Engineering (UNSW) 2006).

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) Marks will be moderated across all the tutorial classes to ensure equity. Any numbers given by your tutor only have meaning inside your class.
(iii) Being able to formulate and ask appropriate questions is an important skill and marks are influenced by the quality of your questions.
(iv) Marks are influenced by your ability to communicate your ideas.

In all assessment tasks, you should read the instructions and pay attention to formal requirements detailed on any relevant cover-sheet.

Course Schedule
An indicative schedule for the classes is shown in Tables 2 to 4. Obviously, given when this outline must be written, the schedule is subject to change, depending upon the availability of our guest speakers. Please confirm the schedules for the 3 strands of classes on the WebVista site.
Your tutorial-seminar class meets 11 times. On each occasion, there will be discussion of ethical issues as they apply in (electrical) engineering practice. The schedule is given in Table 3. Your tutorial class is strictly limited to 16 students and presentations will be made by groups of 4 students.

Students of ELEC4122 have a second set of tutorials with the schedule given in Table 4. For most of these, you will be given preparatory readings & associated questions. The final two are assessment tasks.
<table>
<thead>
<tr>
<th>week</th>
<th>learning focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>organisational behaviour</td>
</tr>
<tr>
<td>2</td>
<td>leadership, not management</td>
</tr>
<tr>
<td>4</td>
<td>evaluating technologies</td>
</tr>
<tr>
<td>6</td>
<td>decision-making exercises</td>
</tr>
<tr>
<td>7</td>
<td>practice questions</td>
</tr>
<tr>
<td>8</td>
<td>strategic planning</td>
</tr>
<tr>
<td>11</td>
<td>class test (closed book)</td>
</tr>
<tr>
<td>12</td>
<td>reflective writing task</td>
</tr>
</tbody>
</table>

Table 4 Schedule for Tuesday Tutorial Activities (ELEC4122 only).
Note that there is no class scheduled for Weeks 3, 5, 9, & 10.

Assessment dates: The formal reports for ELEC4011 are due 2 pm Wednesday Week 10.
The Exam Question and Own-Choice tasks of ELEC4122 must be submitted by the end of the teaching session, i.e. Friday Week 12.
The proposal for the Own-Choice task is due Wednesday Week 6.
Obviously the Week 11 & 12 assessment tasks will be in your respective 1-hr class on Tuesday, Week 11 or 12.
The respective final exams will be held after the end of the teaching session.

Resources for Students

Textbooks

Prescribed textbook

Books are expensive. There is no single prescribed textbook set for this course.

Reference books

Instead, we have identified some excellent reference books that will support your learning.

Martin & Schinzinger (1996) covers the essential material for Part E, and is also generally useful in Part S. The aspects of Part S related to leadership are supported by Northouse (2007) and strategy & technological innovation are discussed in Schilling (2008). A reference generally useful for both Parts is Beder (1998).

As mentioned above, “lecture notes” will not be distributed. However, you will get copies of selected readings associated with the various key topics in Part S. The crucial ones of these will be distributed on paper; others will be found on WebVista.

Other books

There are many better written and more entertaining books that pose significant, timeless ethical issues in works of fiction, yet relevant to engineers, e.g. Asimov (1950), Clarke (1965), Shelley (1818), Stevenson (1886), and Orwell (1949). Similarly, engaging writers (not of textbooks) have explored the challenges and contradictions intrinsic to leadership, organisations, and strategy, e.g. Machiavelli (1532) and Tolkien (1954), or enjoy Shakespeare’s representation of the contrasting leadership involving Richard II (Shakespeare 1595) and Henry V (Shakespeare 1599).
Books covering assumed knowledge
n/a

DVDs
In your first 2 hr tutorial, you will watch a DVD telling the story of a celebrated “engineering achievement” (from *Constructing Australia* 2007, *Seven Wonders of the Industrial World* 2005, *The Great Transatlantic Cable* 2005). The Library has copies of all the sagas and we encourage you to view a couple more during the rest of the session.

On-line resources
There will be an active WebVista site for these courses.
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. Much of this, though, is in a business context.

We invite students who find suitable material, including web-sites, to submit these to be made more widely available.

The Learning Centre
The Learning Centre is located in room 231 of the Menzies (Library) Building. It provides free and confidential academic support services for students. These include 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) basis, or you may choose to discuss your needs with Dr Skinner first.

Other Matters

Academic Honesty and Plagiarism
Plagiarism is the unacknowledged use of other people’s work, including the copying of assignments written by other students or material found on The Web. Plagiarism is considered a serious offence by the University and severe penalties may apply. Any plagiarism will be referred to the Head of School for further action. For more information about plagiarism, please see Learning Centre (2007), or ask us.

Continual Course Improvement
This is the first time that the School has offered ELEC4122 and the final time that ELEC4011 will be available. We are eager to learn from this year’s experience, and thereby to improve
the learning outcomes of current and future students. Students are invited to provide feedback (positive or negative) to the course convener or a tutor, at any time. At the end of the session you will be invited to participate in a voluntary, anonymous survey.

In particular, we need to know what you thought of the new activities introduced in the ELEC4122 tutorials.

The seminar and report topics in Part E (as listed in the Appendix) vary from year to year, in response to students’ choices.

Administrative Matters

On issues and procedures regarding such matters as special needs, equity and diversity, occupational heath and safety, enrolment, rights, and general expectations of students, please refer to the School policies. (see scoff.ee.unsw.edu.au/)

Finally, here is our best advice on how to succeed in this course.

(i) Learn the key principles so that you can identify ethical issues and engage in ethical debates. Working through the textbook 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 the rest will follow. If you haven’t found anything of interest in this course, then start asking questions, and please, please tell us.

Dr Iain Skinner (Course Co-ordinator) & the other Tutors
References


*Constructing Australia* 2007, television series, Australian Broadcasting Corp, Sydney.


Shelley, M. 1818, *Frankenstein*, ... London.

Stevenson, R.L. 1886, *The Strange Case of Dr Jekyll and Mr Hyde*, ... Edinburgh.

*The Great Transatlantic Cable* 2005, television program, Green Umbrella for Public Broadcasting Service, Alexandria (VA, USA).


Note: Publishers not given for years earlier than 1960.
Appendixes

Student Seminar Topics

Under the general headings given, students are required to identify some specific ethical questions, of interest to engineers, and then attempt to answer these questions. They are also expected to provide some general ethical material that is background but necessary to understand the topic. (In ELEC4011, two exam questions will share backgrounds with two topics listed here.)

A. Environmental ethics, waste & the electronics industry
   Reference must be made to IEAust's environmental guidelines (IEAust 1992) and to the concept of sustainable development.

B. Engineering as social experimentation: the case of portable entertainment devices
   To what extent are engineers, who develop new technology, responsibility for resulting changes in society? What are the engineers’ responsibilities if the changes are destructive?

C. Workplace behaviours
   The workplace involves interpersonal relationships and consequent ethical considerations about behaviour, e.g. bullying, harassment, nepotism, appraisals, rewardings, etc. Under Australian legislation, an employer must take “all reasonable steps” to prevent discrimination & harrassment in the workplace (Australian Human Rights and Equal Opportunity Commission 2008). UNSW has a set of relevant policies (UNSW 1998).

D. Genetic screening
   High speed computation allows routine screening of human DNA for a variety of reasons. What limits should be placed on such screening? Who is entitled to know what is found? What does “knowing something” to do a person?

E. Automated surveillance and decision making
   The ethics of having machines make decisions for humans & the use of automatically operated systems.

F. Intellectual property
   The rights and duties of both those who own & those who want to use intellectual property (of relevance to engineering).
   Note and be warned: This is about discussing ethics not laws.

G. The world-wide web & virtual communities
   The ethics of this all-pervasive, potentially intrusive telecommunication system. Does Facebook make community and interpersonal relationships easier or harder? What of privacy?

H. Precision guided weapons
   Ethical issues surrounding the role of engineers in the development and use of weapons.