ENGG200

Engineering Practice

S1 Day 2015

Dept of Engineering

Contents

General Information

Unit convenor and teaching staff
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Credit points
3

Prerequisites
12cp and admission to BE or BEBA or BEBBA or BEBCom or BEBSc

Corequisites

Co-badged status

Unit description
This unit covers a range of engineering specialisations with a series of lectures, laboratory sessions, self-study, group work and activities. Students learn about the process of engineering, solving problems, design and product development. The unit also gives students an opportunity to develop and practise generic skills such as written and oral communication. An aim of this unit is to give students some exposure to the specialisations and streams from which they must choose for the remainder of their studies.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization

Understanding the professional role of the engineer in development and research within the setting of an industrial company, a governmental or non-governmental organization or an academic institute. Having a sense of the variety of engineering disciplines.

Being able to apply mathematical and scientific principles to practical algorithmic

problem solving

Being able to work alone and with others in team

Being able to communicate technical ideas orally and in written form in a sound and correct manner

Desiring to contribute to sustainable development

Having a sense for life-long learning and professional development.

General Assessment Information

In order to complete the unit satisfactorily, the student should have a score of 50% on all assessment tasks.

Extensions are not allowed unless motivated through adequate proof (medical attest, etc.)

Late submission is not allowed and will be penalized as a score of zero for that unit.

Assessment Tasks

Name	Weighting	Due
Project Outline	10%	Week 5
MATLAB exercise	15%	Week 7
Engineering Project Report	45%	Week 10
Project Presentation	30%	Week 12

Project Outline

Due: **Week 5**
Weighting: **10%**

A project theme will be allocated to each practical session class by the second week and each class will subdivide in teams of 4 to 5 students to solve a specific facet of the project theme. The teams will perform project management and come up with a strategic engineering solution that involves the application of acquired technical and mathematical knowledge (first year) and engineering skills that they develop during the semester.

A summary of the project plan (2 pages) and a schedule (1 page) of each team will be handed in and discussed on the 5th week to the tutors.

On successful completion you will be able to:

- Having a sense for life-long learning and professional development.

MATLAB exercise

Due: **Week 7**
Weighting: **15%**

An exercise will be given that involves some MATLAB (or open source: SciLab) programming. A MATLAB (or SciLab) script will be developed by the student that solves a particular engineering or mathematical problem. The student will have some time to work on the exercise in group but can also continue working on it individually at home using the open source software (SciLab).

The solution to the given problem will be handed in in digital format as a MATLAB or SciLab - script.

On successful completion you will be able to:

- Being able to apply mathematical and scientific principles to practical algorithmic problem solving

Engineering Project Report

Due: **Week 10**
Weighting: **45%**

A detailed project report (10 pages max. - not including appendix) will be handed in with the tutors.

The project report should contain the head sections: Title, Table of Contents, Project aim and contents, Materials & Methods, Results (deliverables, solutions), Discussion (recommendations), Conclusions, References/Bibliography, Appendices. Individual student contributions should also be indicated in the report.

A group mark will account for 25% of the total score for the unit and individual student contributions will account for the remaining 20% of the total score for the unit.

On successful completion you will be able to:

- Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization
- Understanding the professional role of the engineer in development and research within the setting of an industrial company, a governmental or non-governmental organization or an academic institute. Having a sense of the variety of engineering disciplines.
- Being able to apply mathematical and scientific principles to practical algorithmic problem solving
- Being able to work alone and with others in team
- Being able to communicate technical ideas orally and in written form in a sound and

correct manner

- Desiring to contribute to sustainable development
- Having a sense for life-long learning and professional development.

Project Presentation

Due: **Week 12**
Weighting: **30%**

Each project team will make and present the project outcome in both a poster AND a powerpoint presentation. The assessment will occur on the basis of the delivered contents (product), the structure and form of the presentation and the oral presentation.

Each student will be presented with a matrix to evaluate the contribution they and their group members had in the project. The values will be averaged and will contribute to 20% of the total assessment of this project.

On successful completion you will be able to:

- Being able to communicate technical ideas orally and in written form in a sound and correct manner

Delivery and Resources

A series of lectures and practical sessions are organized in this unit but the emphasis is on self-learning and self-development through an engineering work project.

Lectures are intended to aid the students to orient themselves in the long tradition of the engineering discipline and obtaining an overview of the contemporary different engineering disciplines. We also reflect on engineering in the context of a society as a whole in which aspects of environmental sustainable development and ethical decision making are emphasized. In addition, some guest lectures will be organized to expose the student to the engineering profession.

The practical sessions are intended to provide the engineering student with a range of professional engineering skills that are generally not covered in regular technical courses including design, graphical representation tools and calculation tools.

During some practical sessions students will have the opportunity to work on the engineering project in individual teams.

Course material in the form of Powerpoint slides and online tutorials will be provided through the online iLearn Learning System at: https://iLearn.mq.edu.au/login/MQ

Also links to open source software and other useful tools will be made available through the online iLearn Learning System.

Recommended books for self-learning:

- Engineering Your Future: An Australasian Guide (Second Edition) by Dowling, Carew

and HadGraft - ed. John Wiley & Sons Australia, Ltd.

Technology used and required

- Library and internet search engines
- Word processing package
- Free graphics design software and presentation software
- Simulation and analysis tools

Unit Schedule

Provisional Unit Schedule

Week	Lecture Topic	Practical Session Topic
1	• Introduction and scope • The Engineering Method	
2	• History of Science and Engineering	
3	• Ethics in Engineering • Library search databases	• Ethics case studies • Engineering project
4	• Effective Communication in Engineering • Data processing and representation	• Graph plotting in Matlab (Scilab) • Engineering project
5	• Engineering design and modeling methods • Oral Communication	• Matlab programming exercise
6	• Industry lecture • Industry experiences	• Engineering project
7	• Industry lecture • Review of Engineering disciplines	• Engineering project • Q&A Latex, Powerpoint, Posters
8	• Review of Engineering disciplines • Engineering Science lecture: Photonics and Optical Engineering	• Engineering project
9	• Review of Engineering disciplines • Engineering Science Lecture: Biomedical Engineering	• Engineering project
10	• Sustainable Engineering • Guest lecture	• Engineering project

Week	Lecture Topic	Practical Session Topic
11	• How to make a powerpoint presentation? • How to present?	• Engineering project
12	• Poster and powerpoint presentations engineering project	
13	• Poster and powerpoint presentations engineering project	

Learning and Teaching Activities

Lecture: Introduction and scope

In this first lecture we will discuss and reflect on the activity of engineering in the human society. We will also discuss the role of the professional organisation 'Engineers Australia' and set the scope for this unit that has an emphasis on self-learning and self-development. We will also reflect on critical thinking, analytical thinking and the engineering method.

Engineering Project

An engineering project will be performed from the first week and will run during the entire semester. The engineering project will be centered around major themes. Student teams of 4 to 5 students will work around a specific aspect of a theme and come up with a concrete solution to the engineering problem. Students are given the task to assure that several engineering skills are covered. The required skill components that need to be covered will be outlined in detail at the start of the project. At the end of the project, students will bring an oral presentation and a poster (in digital format) and hand in a written group report. The assessment will comprise of two components: an overall group mark provided by the tutor and a workload participation mark assessed by the individual members of the group. Students are encouraged to have regular group meetings. While the emphasis of the project is on independent problem-solving, students will have the opportunity to consult the tutors on the progress of the project on a regular basis during special time slots allocated in the practical sessions.

Lecture: History of Science and Engineering

Human evolution is characterized by invention and curiosity and has shaped the environment in which we live today. In this lecture, we will follow mankind from prehistory to modern times in its ascent to understand nature and to create and shape the environment within the context of its Zeitgeist.

Lecture: Ethics in Engineering

After a short overview of philosophical movements and thinkers in normative ethics, we will demonstrate the importance of ethical decision making in engineering and discuss some scenario's where ethical decisions are required.

Practical session: Ethics case studies

Brainstorming session on some ethical case studies. An engineering ethics dilemma is discussed in teams of maximum 5 students. A spokesperson of each group will debrief the class on the viewpoints of the group.

Lecture: Data processing and representation

Various ways of processing and representing data in graphical format will be discussed.

Lecture: Scientific computing in Matlab (Scilab)

In this tutorial lecture we will demonstrate how Matlab can be used as a tool to solve engineering problems and in plotting data in several dimensions. Reference is also made to Scilab that is open source software that can be downloaded free of cost and has a similar syntax to Matlab. Students are encouraged to install either Matlab or Scilab on their home computer to exercise.

Practical session: Matlab programming exercise

A Matlab programming exercise will be given that students can start solving during the practical session but can continue to work on at home. The solution in the form of a Matlab or Scilab script needs to be handed in week 7.

Lecture: Engineering design and modeling methods

A brief overview of some design and modeling tools

Industry lecture

Professionals will speak about their role and activities in their company, the kind of professional problems that they face and what approach they take to solve problems. They will also discuss the expectations that they have towards starting engineers in the company and what they regard as essential skills for engineers.

Review of engineering disciplines at Macquarie University

To help students in their curriculum planning, different lecturers will talk about the discipline and the kind of jobs within that discipline.

Engineering Science Lectures

To expose students to academic research in engineering, two lectures will be given by university researchers. One lecture will be on a photonics and optical engineering topic and another lecture on a biomedical engineering topic.

Q&A Latex, Powerpoint, Posters

Online tutorials on Latex, Powerpoint and the design of posters will be provided on the iLearn Learning System that will provide a set of tools that can be used to format the written report, poster and presentation as part of the engineering project. A time slot will be allocated during the practical session for questions & answers on specific problems with these tools.

Lecture: Sustainable engineering

The concept of sustainable engineering (ecologically, socially and economically) will be discussed and some practical approaches will be provided.

How to prepare a presentation? How to present?

Some guidelines will be provided on preparing and presenting professionally.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops

- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcome

- Being able to apply mathematical and scientific principles to practical algorithmic problem solving

Assessment tasks

- Project Outline
- Engineering Project Report
- Project Presentation

Learning and teaching activities

- In this first lecture we will discuss and reflect on the activity of engineering in the human society. We will also discuss the role of the professional organisation 'Engineers Australia' and set the scope for this unit that has an emphasis on self-learning and self-development. We will also reflect on critical thinking, analytical thinking and the engineering method.

- An engineering project will be performed from the first week and will run during the entire semester. The engineering project will be centered around major themes. Student teams of 4 to 5 students will work around a specific aspect of a theme and come up with a concrete solution to the engineering problem. Students are given the task to assure that several engineering skills are covered. The required skill components that need to be covered will be outlined in detail at the start of the project. At the end of the project, students will bring an oral presentation and a poster (in digital format) and hand in a written group report. The assessment will comprise of two components: an overall group mark provided by the tutor and a workload participation mark assessed by the individual members of the group. Students are encouraged to have regular group meetings. While the emphasis of the project is on independent problem-solving, students will have the opportunity to consult the tutors on the progress of the project on a regular basis during special time slots allocated in the practical sessions.
- A brief overview of some design and modeling tools
- Online tutorials on Latex, Powerpoint and the design of posters will be provided on the iLearn Learning System that will provide a set of tools that can be used to format the written report, poster and presentation as part of the engineering project. A time slot will be allocated during the practical session for questions & answers on specific problems with these tools.
- Some guidelines will be provided on preparing and presenting professionally.

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcome

- Understanding the professional role of the engineer in development and research within the setting of an industrial company, a governmental or non-governmental organization or an academic institute. Having a sense of the variety of engineering disciplines.

Assessment tasks

- Project Outline
- Engineering Project Report
- Project Presentation

Learning and teaching activities

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- After a short overview of philosophical movements and thinkers in normative ethics, we will demonstrate the importance of ethical decision making in engineering and discuss some scenario's where ethical decisions are required.
- Brainstorming session on some ethical case studies. An engineering ethics dilemma is discussed in teams of maximum 5 students. A spokesperson of each group will debrief the class on the viewpoints of the group.
- A Matlab programming exercise will be given that students can start solving during the practical session but can continue to work on at home. The solution in the form of a Matlab or Scilab script needs to be handed in week 7.
- Professionals will speak about their role and activities in their company, the kind of professional problems that they face and what approach they take to solve problems. They will also discuss the expectations that they have towards starting engineers in the company and what they regard as essential skills for engineers.

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization
- Having a sense for life-long learning and professional development.

Assessment tasks

- Engineering Project Report
- Project Presentation

Learning and teaching activities

- In this first lecture we will discuss and reflect on the activity of engineering in the human society. We will also discuss the role of the professional organisation 'Engineers Australia' and set the scope for this unit that has an emphasis on self-learning and self-development. We will also reflect on critical thinking, analytical thinking and the engineering method.
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- Various ways of processing and representing data in graphical format will be discussed.
- To expose students to academic research in engineering, two lectures will be given by university researchers. One lecture will be on a photonics and optical engineering topic and another lecture on a biomedical engineering topic.
- Online tutorials on Latex, Powerpoint and the design of posters will be provided on the iLearn Learning System that will provide a set of tools that can be used to format the written report, poster and presentation as part of the engineering project. A time slot will

be allocated during the practical session for questions & answers on specific problems with these tools.

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization
- Understanding the professional role of the engineer in development and research within the setting of an industrial company, a governmental or non-governmental organization or an academic institute. Having a sense of the variety of engineering disciplines.
- Being able to apply mathematical and scientific principles to practical algorithmic problem solving
- Having a sense for life-long learning and professional development.

Assessment tasks

- Project Outline
- MATLAB exercise
- Engineering Project Report
- Project Presentation

Learning and teaching activities

- In this first lecture we will discuss and reflect on the activity of engineering in the human society. We will also discuss the role of the professional organisation 'Engineers Australia' and set the scope for this unit that has an emphasis on self-learning and self-development. We will also reflect on critical thinking, analytical thinking and the engineering method.
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of 4 to 5 students will work around a specific aspect of a theme and come up with a concrete solution to the engineering problem. Students are given the task to assure that several engineering skills are covered. The required skill components that need to be covered will be outlined in detail at the start of the project. At the end of the project, students will bring an oral presentation and a poster (in digital format) and hand in a written group report. The assessment will comprise of two components: an overall group mark provided by the tutor and a workload participation mark assessed by the individual members of the group. Students are encouraged to have regular group meetings. While the emphasis of the project is on independent problem-solving, students will have the opportunity to consult the tutors on the progress of the project on a regular basis during special time slots allocated in the practical sessions.

- Human evolution is characterized by invention and curiosity and has shaped the environment in which we live today. In this lecture, we will follow mankind from prehistory to modern times in its ascent to understand nature and to create and shape the environment within the context of its Zeitgeist.
- Various ways of processing and representing data in graphical format will be discussed.
- In this tutorial lecture we will demonstrate how Matlab can be used as a tool to solve engineering problems and in plotting data in several dimensions. Reference is also made to Scilab that is open source software that can be downloaded free of cost and has a similar syntax to Matlab. Students are encouraged to install either Matlab or Scilab on their home computer to exercise.
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- Professionals will speak about their role and activities in their company, the kind of professional problems that they face and what approach they take to solve problems. They will also discuss the expectations that they have towards starting engineers in the company and what they regard as essential skills for engineers.
- To help students in their curriculum planning, different lecturers will talk about the discipline and the kind of jobs within that discipline.
- To expose students to academic research in engineering, two lectures will be given by university researchers. One lecture will be on a photonics and optical engineering topic and another lecture on a biomedical engineering topic.
- Online tutorials on Latex, Powerpoint and the design of posters will be provided on the

iLearn Learning System that will provide a set of tools that can be used to format the written report, poster and presentation as part of the engineering project. A time slot will be allocated during the practical session for questions & answers on specific problems with these tools.

- The concept of sustainable engineering (ecologically, socially and economically) will be discussed and some practical approaches will be provided.
- Some guidelines will be provided on preparing and presenting professionally.

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization
- Being able to apply mathematical and scientific principles to practical algorithmic problem solving
- Being able to communicate technical ideas orally and in written form in a sound and correct manner
- Desiring to contribute to sustainable development

Assessment tasks

- Project Outline
- MATLAB exercise
- Engineering Project Report
- Project Presentation

Learning and teaching activities

- In this first lecture we will discuss and reflect on the activity of engineering in the human society. We will also discuss the role of the professional organisation 'Engineers Australia' and set the scope for this unit that has an emphasis on self-learning and self-development. We will also reflect on critical thinking, analytical thinking and the engineering method.

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- After a short overview of philosophical movements and thinkers in normative ethics, we will demonstrate the importance of ethical decision making in engineering and discuss some scenario's where ethical decisions are required.
- Brainstorming session on some ethical case studies. An engineering ethics dilemma is discussed in teams of maximum 5 students. A spokesperson of each group will debrief the class on the viewpoints of the group.
- A Matlab programming exercise will be given that students can start solving during the practical session but can continue to work on at home. The solution in the form of a Matlab or Scilab script needs to be handed in week 7.
- The concept of sustainable engineering (ecologically, socially and economically) will be discussed and some practical approaches will be provided.

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Being able to apply mathematical and scientific principles to practical algorithmic problem solving
- Desiring to contribute to sustainable development

Assessment tasks

- Project Outline
- MATLAB exercise
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Learning and teaching activities

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- The concept of sustainable engineering (ecologically, socially and economically) will be discussed and some practical approaches will be provided.

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Being able to work alone and with others in team
- Being able to communicate technical ideas orally and in written form in a sound and correct manner

Assessment tasks

- Project Outline
- Engineering Project Report
- Project Presentation

Learning and teaching activities

- An engineering project will be performed from the first week and will run during the entire semester. The engineering project will be centered around major themes. Student teams of 4 to 5 students will work around a specific aspect of a theme and come up with a concrete solution to the engineering problem. Students are given the task to assure that several engineering skills are covered. The required skill components that need to be covered will be outlined in detail at the start of the project. At the end of the project, students will bring an oral presentation and a poster (in digital format) and hand in a written group report. The assessment will comprise of two components: an overall group mark provided by the tutor and a workload participation mark assessed by the individual members of the group. Students are encouraged to have regular group meetings. While the emphasis of the project is on independent problem-solving, students will have the opportunity to consult the tutors on the progress of the project on a regular basis during special time slots allocated in the practical sessions.
- Brainstorming session on some ethical case studies. An engineering ethics dilemma is discussed in teams of maximum 5 students. A spokesperson of each group will debrief the class on the viewpoints of the group.
- Professionals will speak about their role and activities in their company, the kind of professional problems that they face and what approach they take to solve problems.

They will also discuss the expectations that they have towards starting engineers in the company and what they regard as essential skills for engineers.
- Some guidelines will be provided on preparing and presenting professionally.

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization
- Desiring to contribute to sustainable development

Assessment tasks

- Engineering Project Report
- Project Presentation

Learning and teaching activities

- An engineering project will be performed from the first week and will run during the entire semester. The engineering project will be centered around major themes. Student teams of 4 to 5 students will work around a specific aspect of a theme and come up with a concrete solution to the engineering problem. Students are given the task to assure that several engineering skills are covered. The required skill components that need to be covered will be outlined in detail at the start of the project. At the end of the project, students will bring an oral presentation and a poster (in digital format) and hand in a written group report. The assessment will comprise of two components: an overall group mark provided by the tutor and a workload participation mark assessed by the individual members of the group. Students are encouraged to have regular group meetings. While the emphasis of the project is on independent problem-solving, students will have the opportunity to consult the tutors on the progress of the project on a regular basis during special time slots allocated in the practical sessions.
- After a short overview of philosophical movements and thinkers in normative ethics, we

will demonstrate the importance of ethical decision making in engineering and discuss some scenario's where ethical decisions are required.
- Brainstorming session on some ethical case studies. An engineering ethics dilemma is discussed in teams of maximum 5 students. A spokesperson of each group will debrief the class on the viewpoints of the group.
- The concept of sustainable engineering (ecologically, socially and economically) will be discussed and some practical approaches will be provided.

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Appreciating the main characteristics of engineering from a historical and contemporary perspective and recognizing professional, social, economical, ethical and environmental aspects of the engineering specialization
- Being able to work alone and with others in team
- Being able to communicate technical ideas orally and in written form in a sound and correct manner
- Desiring to contribute to sustainable development

Assessment tasks

- Engineering Project Report
- Project Presentation

Learning and teaching activities

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Changes from Previous Offering

- Lecture presentations have been rewritten and a lecture on the history of Engineering has been added.
- A practicum on ethics is added.
- CAD design has been removed from the program as it is covered in dedicated units.
- No lecture on Latex will be given but an online tutorial is provided on iLearn.