ENGG2050
Engineering Systems and Design Thinking
Session 1, In person-scheduled-weekday, North Ryde 2024
School of Engineering

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https://unitguides.mq.edu.au/unit_offerings/163479/unit_guide/print
**General Information**

<table>
<thead>
<tr>
<th>Unit convenor and teaching staff</th>
<th>Rex Di Bona</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><a href="mailto:rex.dibona@mq.edu.au">rex.dibona@mq.edu.au</a></td>
</tr>
<tr>
<td>Contact via Private message on iLearn</td>
<td>Level 1, 50 Waterloo Road</td>
</tr>
<tr>
<td>Wed 11-12 am</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Viken Kortian</td>
<td><a href="mailto:viken.kortian@mq.edu.au">viken.kortian@mq.edu.au</a></td>
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<td>Contact via Private Message on iLearn</td>
<td>Level 1, 50 Waterloo Road</td>
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<tr>
<td>By appointment</td>
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| Credit points | 10 |

**Prerequisites**

(ENGG1050 or ENGG100) and (COMP1000 or COMP115) and (MATH1010 or MATH1015 or MATH135 or MATH132 or MATH1007 or DMTH137)

**Corequisites**

**Co-badged status**

**Unit description**

The 3rd SPINE unit aimed to develop professional, transferable and employability skills. The unit deals with the design of complex systems from a top-down perspective. Students will be exposed to different engineering management approaches (waterfall and Agile) and other tools involved in the field of systems engineering. Students will be able to apply Design Thinking processes and apply problem-solving heuristics to solve complex engineering systems.

**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:

**ULO1:** Evaluate a complex engineering problem from a range of perspectives, such as
technological, social, environmental, financial, professional and ethical.

**ULO2**: Analyse and describe large engineering problems and related systems and subsystems.

**ULO3**: Apply appropriate engineering modelling and management tools in analysing a large engineering system.

**ULO4**: Apply design thinking and associated thinking techniques in generating a variety of solutions.

**ULO5**: Explain and integrate human and non-technical elements in an engineering project and its associated systems.

### General Assessment Information

#### Grading and passing requirements for unit

In order to pass this unit, a student must submit a response for all assessment tasks, and obtain a mark of 50 or more the unit (i.e. obtain a passing grade P/ CR/ D/ HD).

For further details about grading, please refer to the policies and procedures section.

#### Hurdle Requirements

Starting from 2nd year and onwards, all SPINE units will be applying a professional hurdle requirement widely known as “Fitness to Practice”. According to the policy, fitness to practice is deemed as exhibiting behaviours that demonstrate professional competence, acceptable professional behaviour, freedom from an impairment, and compliance with program-specific requirements needed for a student to practice properly and safely throughout their Practical, Clinical or Professional program or unit. Failure to demonstrate these qualities will result in students being at risk of not progressing in the professional engineering program regardless of their marks and grades within individual units. Please refer to the University policy for further details.

#### Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of ‘0’ will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern. **You should contact your convenor through iLearn for any anticipated issues that might prevent you from a timely submission of work.**

Re-submission for any submitted and/or graded work will not be allowed.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration.

Assessments where Late Submissions will be accepted: **Case Study 1, Case Study 2,**
### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case study 1</td>
<td>15%</td>
<td>No</td>
<td>Week 5</td>
</tr>
<tr>
<td>Online quizzes</td>
<td>40%</td>
<td>No</td>
<td>Multiple Weeks</td>
</tr>
<tr>
<td>Infographic submission</td>
<td>10%</td>
<td>No</td>
<td>Week 9</td>
</tr>
<tr>
<td>Reflective Writing</td>
<td>10%</td>
<td>No</td>
<td>Multiple Weeks</td>
</tr>
<tr>
<td>Case study 2</td>
<td>15%</td>
<td>No</td>
<td>Week 11</td>
</tr>
<tr>
<td>In class presentation</td>
<td>10%</td>
<td>No</td>
<td>Week 13</td>
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### Case study 1

Assessment Type: Case study/analysis  
Indicative Time on Task: 20 hours  
Due: Week 5  
Weighting: 15%

Case study on engineering systems

On successful completion you will be able to:  
- Evaluate a complex engineering problem from a range of perspectives, such as
On successful completion you will be able to:

- Analyse and describe large engineering problems and related systems and subsystems.
- Apply appropriate engineering modelling and management tools in analysing a large engineering system.
- Apply design thinking and associated thinking techniques in generating a variety of solutions.
- Explain and integrate human and non-technical elements in an engineering project and its associated systems.
Reflective Writing

Assessment Type: Reflective Writing
Indicative Time on Task: 10 hours
Due: Multiple Weeks
Weighting: 10%

Reflective writing on skills learnt.

On successful completion you will be able to:

• Evaluate a complex engineering problem from a range of perspectives, such as technological, social, environmental, financial, professional and ethical.
• Analyse and describe large engineering problems and related systems and subsystems.
• Apply appropriate engineering modelling and management tools in analysing a large engineering system.
• Apply design thinking and associated thinking techniques in generating a variety of solutions.
• Explain and integrate human and non-technical elements in an engineering project and its associated systems.

Case study 2

Assessment Type: Case study/analysis
Indicative Time on Task: 20 hours
Due: Week 11
Weighting: 15%

Case study on engineering systems

On successful completion you will be able to:

• Evaluate a complex engineering problem from a range of perspectives, such as technological, social, environmental, financial, professional and ethical.
• Analyse and describe large engineering problems and related systems and subsystems.
• Explain and integrate human and non-technical elements in an engineering project and its associated systems.
In class presentation

Assessment Type 1: Presentation
Indicative Time on Task 2: 10 hours
Due: Week 13
Weighting: 10%

In class presentation on a given research topic

On successful completion you will be able to:

• Apply appropriate engineering modelling and management tools in analysing a large engineering system.
• Explain and integrate human and non-technical elements in an engineering project and its associated systems.

1 If you need help with your assignment, please contact:

• the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
• the Writing Centre for academic skills support.

2 Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

COMMUNICATIONS

Students are reminded the University will communicate all official notices to you by email to your university email account. Please read your @student.mq.edu.au email regularly, or forward it to an account you do read regularly. All announcements and other communications regarding this unit will be via the unit iLearn website, https://ilearn.mq.edu.au/ Please do not email unit convenors and other staff directly, but instead use the "Important Private Messages to Unit Contacts” forum on the unit website in iLearn.

TEXTBOOK


It is required that every student have access to this textbook - weekly readings are assigned (see the Unit Schedule on the unit's iLearn website) and must be completed before class. A limited
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Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

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

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.
IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

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

Changes from Previous Offering

The ordering of some assessment tasks has changed. A simulated project and more individual work for each SGTA has been introduced. Reflection writing has been introduced. More fun has hopefully been added to the tasks. The case studies have been changed. Additional material on numerical and monetary importance has been added. The Quizzes have changed to reflect the updated material.

Engineers Australia Competency Mapping

<table>
<thead>
<tr>
<th>EA Competency Standard</th>
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<tr>
<td>Knowledge and Skill Base</td>
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<tr>
<td>1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline.</td>
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<tr>
<td>1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.</td>
<td>ULO3</td>
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<td>1.3 In-depth understanding of specialist bodies of knowledge</td>
<td>ULO3</td>
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<td>1.4 Discernment of knowledge development and research directions</td>
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<td>1.5 Knowledge of engineering design practice</td>
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<td>1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.</td>
<td>ULO3, ULO5</td>
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<tr>
<td>Engineering Application Ability</td>
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<tr>
<td>2.1 Application of established engineering methods to complex problem solving</td>
<td>ULO1, ULO2, ULO3</td>
</tr>
<tr>
<td>2.2 Fluent application of engineering techniques, tools and resources.</td>
<td>ULO2, ULO3, ULO5</td>
</tr>
<tr>
<td>2.3 Application of systematic engineering synthesis and design processes.</td>
<td>ULO4</td>
</tr>
<tr>
<td>2.4 Application of systematic approaches to the conduct and management of engineering projects.</td>
<td>ULO1, ULO2</td>
</tr>
<tr>
<td>Professional and Personal Attributes</td>
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<tr>
<td>3.1 Ethical conduct and professional accountability.</td>
<td>ULO1</td>
</tr>
<tr>
<td>3.2 Effective oral and written communication in professional and lay domains.</td>
<td>ULO1</td>
</tr>
<tr>
<td>3.3 Creative, innovative and pro-active demeanour.</td>
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<tr>
<td>3.4 Professional use and management of information.</td>
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<tr>
<td>3.5 Orderly management of self, and professional conduct.</td>
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<tr>
<td>3.6 Effective team membership and team leadership</td>
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Unit information based on version 2024.02 of the Handbook.