



ENGG1050

Engineering Design

Session 1, In person-scheduled-weekday, North Ryde 2023

School of Engineering

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General Information

Unit convenor and teaching staff

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Convenor

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Credit points

10

Prerequisites

ENGG1000

Corequisites

Co-badged status

Unit description

The 2nd SPINE unit aimed to develop professional, transferable and employability skills. The unit consists of a series of online modules, electoral and project-based learning activities. This unit introduces engineering challenges that demand the students to apply fundamental knowledge in resolving ill-defined engineering problems. Students will be exposed to a team-based working environment that is representative of any working engineering groups. Through project-based learning and scaffolded activities, students will develop the competencies and transferable skills required to tackle more advance and domain-specific engineering problems.

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 an engineering problem and enumerate related constraints and requirements.

ULO2: Communicate an engineering problem and associated solutions professionally, both orally and in writing.

ULO3: Employ strategies to collaborate effectively with a team on solving an engineering problem.

ULO4: Apply the structured engineering design process framework in defining and solving imprecisely defined engineering problems.

ULO5: Apply constructive techniques to reflect upon positive and negative experiences for personal and professional growth.

General Assessment Information

General Assessment Information

Grading and passing requirements for unit

In order to pass this unit, a student must obtain a mark of 50 or more for 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.

Late Assessment Submission Penalty

Students enrolled in Session-based units with written assessments will have the following university standard late penalty applied. Please see <https://students.mq.edu.au/study/assessments-exams/assessments> for more information.

Unless a Special Consideration request has been submitted and approved, a **5% penalty** (of the total possible mark) will be applied each day a written 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. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern. **You should contact your convenor 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.

Late submission will require justification via an approved [Special Consideration](#) process, if not late penalty procedure will be followed.

Your assessments are a key element in your learning process. [Find out about the types of assessments you may need to complete at Macquarie.](#)

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>A1. Practice Based Task</u>	10%	No	W1-W13
<u>A2. Professional development</u>	15%	No	W1 and W12
<u>A3. Periodic Quizzes</u>	20%	No	W1, W2, W3, W8, W9 and W10
<u>A4. Project</u>	35%	No	W7 and W13
<u>A5. Technical Writing</u>	15%	No	W8
<u>A6. Reflection</u>	5%	No	W6 and W11

A1. Practice Based Task

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 1 hours

Due: **W1-W13**

Weighting: **10%**

Students will demonstrate practice based skills and contribute to workshop activities throughout the session.

On successful completion you will be able to:

- Employ strategies to collaborate effectively with a team on solving an engineering problem.

A2. Professional development

Assessment Type ¹: Portfolio

Indicative Time on Task ²: 2 hours

Due: **W1 and W12**

Weighting: **15%**

Professional development and portfolio managing. As a part of the development of professional identity and personal development, students are required to participate in a range of professional development activities which may include attending seminars by industry experts or demonstrate contribution towards student society.

On successful completion you will be able to:

- Communicate an engineering problem and associated solutions professionally, both orally and in writing.
- Apply constructive techniques to reflect upon positive and negative experiences for personal and professional growth.

A3. Periodic Quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 2.5 hours

Due: **W1, W2, W3, W8, W9 and W10**

Weighting: **20%**

Ongoing fortnightly online quizzes on podcast related topics and materials from designated study texts.

On successful completion you will be able to:

- Evaluate an engineering problem and enumerate related constraints and requirements.
- Apply the structured engineering design process framework in defining and solving imprecisely defined engineering problems.
- Apply constructive techniques to reflect upon positive and negative experiences for personal and professional growth.

A4. Project

Assessment Type ¹: Project

Indicative Time on Task ²: 4 hours

Due: **W7 and W13**

Weighting: **35%**

A small team-based project. Students are required to apply strategies learnt in this unit and apply hands on skills when required to work in a team-based engineering challenge. Students will have weekly deliverables and project milestones and will be required to present at the end of the project.

On successful completion you will be able to:

- Evaluate an engineering problem and enumerate related constraints and requirements.
- Communicate an engineering problem and associated solutions professionally, both orally and in writing.
- Employ strategies to collaborate effectively with a team on solving an engineering problem.
- Apply the structured engineering design process framework in defining and solving imprecisely defined engineering problems.

A5. Technical Writing

Assessment Type ¹: Report

Indicative Time on Task ²: 5 hours

Due: **W8**

Weighting: **15%**

Students will be required to collect data and present technical data and experimental design in a technical report.

On successful completion you will be able to:

- Communicate an engineering problem and associated solutions professionally, both orally and in writing.

A6. Reflection

Assessment Type ¹: Reflective Writing

Indicative Time on Task ²: 2 hours

Due: **W6 and W11**

Weighting: **5%**

Reflective writing on transferable skills learnt. There will be two required submission at two-time points in the semester. Refer to iLearn for more information.

On successful completion you will be able to:

- Apply constructive techniques to reflect upon positive and negative experiences for personal and professional growth.

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

ENGG1050 is the second in the Engineering Spine series and teaches on-line team working skills to complement the autonomous working and face to face skills addressed in ENGG1000. ENGG1050 provides an opportunity for students to work in a small team applying the Engineering Design process to the design, construction and optimisation of a Rube Goldberg Machine. The emphasis of this unit is in the development of professional, interpersonal and presentational skills in an engineering environment. Content is provided in a series of recorded lectures, reading material and other on-line resources and content supplemented by periodic quizzes. A weekly three hour workshop provides an opportunity for students to practice team and presentational skills and receive feedback. This will be supplemented by an additional self-organised team meeting between workshops. Workshops will be on-line accessible via zoom.

Unit Schedule

Version 1.0							
	SGTA	University Events	Topics	Personal Brand Development (in LinkedIn) complete before SGTA	Professional Meetings		Assessments
					Student activities to be completed prior to workshop	Workshop Activities	
W1	20-Feb		Personal and Professional Development	Create or update your LinkedIn profile.	Complete PPD Quiz. Set up LinkedIn Learning and Miro. Practice using Miro. Complete DISC analysis.	Meet and Greet your team, Meet tutors, Discuss your DISC results. Start work on Team Charter using Miro. Agree roles for each week including Chair, Minute Taker and Presenter. Send a professional EMAIL to your tutor. Upload LinkedIn screenshots.	PPD Quiz and LinkedIn screenshots.

W2	27-Feb	Last enrol date 5th March	Project Management	Grow your network, join a group, follow someone you admire.	Complete PM Quiz. Map your DISC results onto Belbin's team roles. Use Miro to complete your Team Charter, study project brief, develop time line and assign ownership to tasks.	One team member presents Team Charter to Tutor Group. Tutor selects one team to present to Posse. Tutors provide feedback on professional EMAILs. Team Reflection on process of formulating your Team Charter. Discuss RGM brief. Complete development of detailed project plan including task ownership. Email copy of minutes including reflection and project plan to your Tutor.	PM Quiz.
W3	6-Mar		Ideation and Engineering Design	Complete a LinkedIn Learning course on Brainstorming	Complete ED Quiz. Use Miro to brainstorm a theme for your RGM.	One team member presents RGM theme ideas to Tutor Group. Tutor selects one team to present to Posse. Tutor provides feedback on project plan and minutes. Team reflection on Brainstorming. Discuss project risks. Update project plan in light of this analysis. Email copy of minutes including reflection to your Tutor.	ED Quiz.
W4	13-Mar		EDP: Problem Definition	Complete a LinkedIn Learning course on Agile Project Management.	Complete Problem Definition.	One team member presets problem definition results to Tutor Group. Tutor selects one team to present to Posse. Tutor provides feedback on team minutes. Team reflection on effectiveness of your teamworking. Start work on preliminary design. Email copy of minutes including reflection to your Tutor.	

W5	20-Mar		EDP: Conceptual Design	Grow your network, reach out to your team mates.	Use Brainstorming to ideate. Complete Conceptual Design.	One team member presets RGM conceptual design to Tutor Group. Tutor selects one team to present to Posse. Tutor provides feedback on group minutes. Team reflection on Online Working. Start work on preliminary design. Email copy of minutes including reflection to your Tutor.	
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W6	27-Mar		EDP: Preliminary Design	Follow relevant institutions and companies.	Complete Preliminary Design. Complete Risk Assessment. Plan your Week 7 team presentation.	One team member presets RGM Preliminary Design to Tutor Group. Tutor selects one team to present to Posse. Tutor provides feedback on group minutes. Team discusses risk assesment with tutor. Complete SparkPlus assesment. Team reflection on the effectiveness of your presentations so far. Determine tasks and assign ownership for preparation of Week 7 presentation. Email copy of minutes including reflection to your Tutor.	Personal Reflection 1.
W7	3-Apr		EDP: Detailed Design	Get ten more contacts.	Complete Detailed Design. Practice team presentation.	Team Presentation 1: RGM Detailed Design. Students complete self and peer assesment forms.	Presentation 1.
	10-Apr	Session Break			Build RGM components		
	17-Apr	Session Break			Test RGM components		
W8	24-Apr	Last withdrawal without fail 28th April	Analysis	Complete all sections of your LinkedIn profile (check against rubric).	Complete Analysis Quiz. Determine initial RGM reliability.	One team member presents initial reliability assesment to Tutor Group. One team selected to present to Posse. Tutor provides feedback on minutes and Presentation 1. Team reflection on Presentation 1. Plan reliability improvemet strategy. Determine priority list for component optimisation. Set target reliabilities. Email copy of minutes including reflection to your Tutor.	Technical Writing Challenge and Analysis Quiz.
W9	1-May		Social Responsibility	Complete a LinkedIn Learning course on Corporate Social Responsibility.	Complete SR Quiz. Use critical thinking to review strategy to improve RMG reliability	One team member presents methodologies employed to improve reliability to Tutor Group. One team per TG selected to present to Posse. Tutor provides feedback on group minutes. Team reflection on your use of critical thinking. Update plan how to achieve RGM reliability targets. Email copy of minutes including reflection to your Tutor.	SR Quiz.

W10	8-May	Communication and Failure Analysis	Complete a LinkedIn Learning course on presentation skills.	Complete Comm. Quiz. Determine final RGM reliability.	One team member presents final reliability analysis to Tutor Group. One team per TG selected to present to Posse. Tutor provides feedback on group minutes. team reflection on your team communication during optimization process. Plan your RGM video. Assign roles and responsibilities. Email copy of minutes including reflection to your Tutor.	Comm. Quiz.
W11	15-May	Systems thinking. Sustainability. Being a professional Engineer.	Update your sustainability credentials.	Record component videos.	Share your best RGM component video with Tutor Group. Tutor selects one team for presentation to Posse. Tutor provides feedback on group minutes. Team reflection on video making process. Plan presentation. Email copy of minutes including reflection to your Tutor.	Personal Reflection 2.
W12	22-May	Innovation and Entrepreneurship	Endorse your teammates in LinkedIn.	Complete final video and Develop Team Presentation	Share your final RGM video with Tutor Group. Tutor selects one team to present to whole class. Tutor provides feedback on group minutes. Complete SparkPlus assesment. Complete LEU. Upload final LinkedIn screenshots. Upload final video. Email copy of minutes to your Tutor.	LinkedIn screenshots.
W13	29-May	Final Presentation		Practice Team Presentation	Team Presentation 2: Engineering Design Process	Presentation 2.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/su\)](https://students.mq.edu.au/su)

[upport/study/policies](#)). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](#) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

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.

Engineers Australia Competency Mapping

Type	Description	Unit Learning Outcomes
KNOWLEDGE AND SKILL BASE	1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	
	1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and Electronic and information sciences which underpin the engineering discipline.	ULO4
	1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	ULO4
	1.4 Discernment of knowledge development and research directions within the engineering discipline.	
	1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline.	ULO4
	1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.	

ENGINEERING APPLICATION ABILITY	2.1 Application of established engineering methods to complex engineering problem solving.	ULO1
	2.2 Fluent application of engineering techniques, tools and resources.	ULO1
	2.3 Application of systematic engineering synthesis and design processes	ULO1, ULO4
	2.4 Application of systematic approaches to the conduct and management of engineering projects.	ULO1
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.1 Ethical conduct and professional accountability.	ULO5
	3.2 Effective oral and written communication in professional and lay domains.	ULO1, ULO2
	3.3 Creative, innovative and pro-active demeanour.	ULO5
	3.4 Professional use and management of information.	
	3.5 Orderly management of self, and professional conduct.	ULO5
	3.6 Effective team membership and team leadership	ULO3