MECH8203

Additive Manufacturing

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Engineering

Contents

General Information

Unit convenor and teaching staff
Course Convenor & Lecturer
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9 Wally's Walk , Room 296
Wednesday 12:00-2:00pm

Credit points
10

Prerequisites
40 CP at 6000 level or above including MECH6005

Corequisites

Co-badged status

Unit description
This unit offers comprehensive knowledge and skills in cutting-edge manufacturing techniques with an emphasis on sustainability and a focus on additive manufacturing. Students will develop deep understanding about the constraints of present manufacturing processes. This unit aims to empower students by helping them to integrate the knowledge areas of state-of-the-art manufacturing techniques and also to provide them with the experience to convert digital concepts into tangible realities. By helping students to appreciate vital aspects like diverse printing methods and their practical use in different industries, this unit will provide students with valuable insights into the evolving landscape of manufacturing. By the end, students will possess transformative knowledge, primed to navigate the future of manufacturing processes.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Industry, Innovation and Infrastructure; Responsible Consumption and Production

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: Demonstrate the ability to critically assess, reflect and analyse various additive manufacturing technologies, materials, and processes, enabling informed decision-making in design and production.
ULO2: Exhibit high level expertise in translating digital designs into functional prototypes through additive manufacturing and employing rapid prototyping techniques to accelerate the iterative design process.
ULO3: Critically evaluate and select appropriate materials for additive manufacturing based on their mechanical, thermal, and chemical characteristics, ensuring optimal performance and sustainability in end-use applications.
ULO4: Interpret and transmit knowledge, skills and ideas of real-world applications of additive manufacturing across industries, investigating case studies and scenarios to analyse how this technology disrupts traditional manufacturing paradigms to enable new avenues for innovation.

General Assessment Information

Student Responsibilities

Be familiar with University policy and procedures and act in accordance with those policies and procedures.

It is the responsibility of the student to retain a copy of any work submitted. Students must provide these documents upon request. Copies should be retained until the end of the grade appeal period each term.

The student is to perform the required due diligence for their assessment grade and rectify as soon as possible upon finding any errors.

Late Submission

Late Submission Policy

- **5% penalty per day:** If you submit your assessment late, **5% of the total possible marks** will be deducted for each day (including weekends), up to 7 days.
    - *Example 1 (out of 100):* If you score 85/100 but submit 20 hours late, you will lose 5 marks and receive **80/100**.
    - *Example 2 (out of 30):* If you score 27/30 but submit 1 day late, you will lose 1.5 marks and receive **25.5/30**.
- **After 7 days:** Submissions more than 7 days late will receive a **mark of 0**.
- **Extensions:**
    - **Automatic short extension**: Some assessments are eligible for automatic short extension. You can only apply for an automatic short extension before the due date.
    - **Special Consideration**: If you need more time due to serious issues and for any assessments that are not eligible for Short Extension, you must apply for Special Consideration.

Need help? Review the Special Consideration page HERE

Practical Component

Attendance at practical classes is mandatory prior to submitting the lab report. Any lab report submitted without attending the corresponding practical session will receive a grade of **0**, even if it is submitted by the due date.

Students who are unable to attend a practical session must submit a **special consideration request** and have it approved in order for alternative arrangements to be organised.

Resubmission option

Resubmission of any assessment task is not allowed under any circumstances.

Notifications

Formal notification of assessment tasks, grading rubrics, and due dates will be posted on iLearn. Although all reasonable measures to ensure the information is accurate, The University reserves the right to make changes without notice. Each student is responsible for checking iLearn for changes and updates.

Assignment submissions and plagiarism policies

All assignments and reports must be submitted electronically through iLearn (in pdf format). Submissions will undergo plagiarism checkers using the Turnitin software (where applicable) and any work deemed to have a 30% or higher similarity score may incur an academic penalty. For more details on the policies of academic penalties relating to academic honesty, please refer to the policies and procedures section below.

Submissions are expected to be typed set in a logical layout and sequence. Markers WILL NOT grade poorly organized or illegible scans or drafts. The expected workload includes the preparation of final copies and clear diagrams.

Grading and passing requirements for unit

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

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).

The unit will be graded according to the Macquarie University Grading policy. The following grades will be used according to the listed numerical range:

ASSESSMENT GRADES AND STATUS

GRADE	RANGE	STATUS ('Standard Grade' in AMIS)	DESCRIPTION
HD	85-100	Pass	Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality, insight, or creativity in identifying, generating, and communicating competing arguments, perspectives or problem-solving approaches; critical evaluation of problems, their solutions, and their implications; creativity in the application as appropriate to the program.
D	75-84	Pass	Provides evidence of integration and evaluation of critical ideas, principles, and theories, distinctive insight, and ability in applying relevant skills and concepts in relation to learning outcomes. There is a demonstration of frequent originality or creativity in defining and analyzing issues or problems and providing solutions; and the use of means of communication appropriate to the program and the audience.
CR	65-74	Pass	Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is a demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the program.
P	50-64	Pass	Provides sufficient evidence of the achievement of learning outcomes. There is a demonstration of understanding and application of fundamental concepts of the program; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the program. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.
F	0-49	Fail	Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing, or lacking communication of ideas in ways that give little attention to the conventions of the program.

Final Examinations

Final examinations will typically take place at the end of the semester during the University examination period. For further information, please refer to the Examination Timetable website on www.mq.edu.au

If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period, typically about 3 to 4 weeks after the normal exam period. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Design assignment	20%	No	06/09/2026	Individual	Yes	Open
Final Exam	50%	No	Exam Period	Individual	No	Observed
Hands-on Practical Skills and poster presentation	30%	No	Week 13	Individual	No	Observed

Design assignment

Assessment Type [1]: Experiential task
Indicative Time on Task [2]: 30 hours
Due: **06/09/2026**
Weighting: **20%**
Groupwork/Individual: Individual
Short extension [3]: Yes
AI Approach: Open

This assessment evaluates your ability to apply the theories to an industry oriented design

On successful completion you will be able to:

- Demonstrate the ability to critically assess, reflect and analyse various additive manufacturing technologies, materials, and processes, enabling informed decision-making in design and production.
- Interpret and transmit knowledge, skills and ideas of real-world applications of additive manufacturing across industries, investigating case studies and scenarios to analyse how this technology disrupts traditional manufacturing paradigms to enable new avenues for innovation.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 10 hours
Due: **Exam Period**
Weighting: **50%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- Demonstrate the ability to critically assess, reflect and analyse various additive manufacturing technologies, materials, and processes, enabling informed decision-making in design and production.
- Exhibit high level expertise in translating digital designs into functional prototypes through additive manufacturing and employing rapid prototyping techniques to accelerate the iterative design process.
- Critically evaluate and select appropriate materials for additive manufacturing based on their mechanical, thermal, and chemical characteristics, ensuring optimal performance and sustainability in end-use applications.
- Interpret and transmit knowledge, skills and ideas of real-world applications of additive manufacturing across industries, investigating case studies and scenarios to analyse how this technology disrupts traditional manufacturing paradigms to enable new avenues for innovation.

Hands-on Practical Skills and poster presentation

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 20 hours
Due: **Week 13**
Weighting: **30%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

This assessment involves hands-on session where you work individually to design and manufacture a simple prototype using additive manufacturing techniques.

On successful completion you will be able to:

- Exhibit high level expertise in translating digital designs into functional prototypes through additive manufacturing and employing rapid prototyping techniques to accelerate the iterative design process.
- Critically evaluate and select appropriate materials for additive manufacturing based on their mechanical, thermal, and chemical characteristics, ensuring optimal performance and sustainability in end-use applications.

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[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

- Academic Success 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.

[3] An automatic short extension is available for some assessments. Apply through the Service Connect Portal.

Delivery and Resources

- **Delivery:** This unit will be presented in weekly (double) lectures; and in weekly SGTAs (10 SGTAs, 4 pracs).
- **Textbook**: The following textbook is recommended, but not prescribed: **Additive manufacturing technologies,** Ian Gibson, David Rosen, Brent Stucker, 2nd edition, Springer.
- **Methods of Communication:** We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent from your **university email** address.
- **COVID Information:** For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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/support/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 connect.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/

Academic Success

Academic Success provides resources to develop your English language proficiency, academic writing, and communication skills.

- Ask a Study Coach
- 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 the Service Connect Portal, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit https://students.mq.edu.au/support/technology/service-desk.

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

EA Competency Standard		Unit Learning Outcomes
Knowledge and Skill Base	1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline.	ULO1 & ULO2 & ULO3 & ULO4
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	
	1.3 In-depth understanding of specialist bodies of knowledge	ULO4
	1.4 Discernment of knowledge development and research directions	ULO1 & ULO2 & ULO3 & ULO4
	1.5 Knowledge of engineering design practice	
	1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.	
Engineering Application Ability	2.1 Application of established engineering methods to complex problem solving	ULO1 & ULO2 & ULO3 & ULO4
	2.2 Fluent application of engineering techniques, tools and resources.	ULO1 & ULO2 & ULO3 & ULO4

	2.3 Application of systematic engineering synthesis and design processes.	
	2.4 Application of systematic approaches to the conduct and management of engineering projects.	
Professional and Personal Attributes	3.1 Ethical conduct and professional accountability.	ULO1 & ULO2 & ULO3
	3.2 Effective oral and written communication in professional and lay domains.	
	3.3 Creative, innovative and pro-active demeanour.	ULO4
	3.4 Professional use and management of information.	ULO1 & ULO2 & ULO3
	3.5 Orderly management of self, and professional conduct.	
	3.6 Effective team membership and team leadership	

Unit information based on version 2026.03 of the Handbook