

UNSW Engineering Education Specification

1. Program Overview

Program Title: Master of Engineering

Award Title: Master of Engineering (Biomedical Engineering)

Engineering Discipline: Biomedical Engineering

The Master of Engineering (Biomedical Engineering) program is a 96 units of credit postgraduate engineering qualification designed to extend students' knowledge, skills, and professional capability in biomedical engineering. Building on prior study in engineering, biomedical science, or a cognate field, the program provides advanced, industry-relevant training spanning biomedical devices, biomechanics, biomaterials, digital health, bioinstrumentation, bioinformatics, tissue engineering, and clinical technology.

Graduates develop advanced technical proficiency, engineering design capability, and professional practice skills required for biomedical engineering roles in healthcare, medical devices, biotechnology, rehabilitation technology, health informatics, and emerging digital health industries.

The program is structured to meet the Engineers Australia Stage 1 Competency Standard for professional engineers, ensuring that graduates achieve:

- Breadth and depth of engineering knowledge relevant to biomedical systems
- Advanced engineering application skills including modelling, simulation, design and analysis
- Professional and personal attributes including ethical conduct, teamwork, communication, project management, and reflective practice

Learning experiences are supported by UNSW's strong biomedical ecosystem, including the Randwick Health & Innovation Precinct, the School of Biomedical Engineering, and industry partnerships across medical device companies, biotech start-ups, and major hospital networks.

2. Career Alignment

The Biomedical Engineering specialisation will prepare graduates for diverse advanced engineering and managerial roles across healthcare and technology sectors, including:

- **Medical Device Design and Manufacturing:** Roles in companies developing implants, prosthetics, and diagnostic equipment.
- **Clinical Engineering:** Supporting hospital systems with technology integration and maintenance.
- **Digital Health and AI Applications:** Innovating in telehealth, wearable sensors, and data-driven diagnostics.

- **Rehabilitation and Assistive Technologies:** Designing solutions for improved patient mobility and quality of life.
- **Research and Development:** Contributing to biomedical innovation in academic, clinical, and commercial settings.

The curriculum will embed regulatory awareness, ethical practice, and interdisciplinary collaboration, skills highly valued by employers and essential for leadership in emerging fields such as personalized medicine and bioinformatics.

3. Specialisation Framework

Upon completion of this Master program, students will be able to:

- Apply advanced engineering fundamentals to model, analyse, and evaluate biomedical systems, devices, and data.
- Design, implement, and validate biomedical engineering solutions, incorporating human physiology, clinical requirements, materials, instrumentation, or computational methods as appropriate.
- Integrate multidisciplinary knowledge from engineering, biology, anatomy, physiology, and clinical practice in the development of biomedical technologies.
- Use contemporary engineering software, tools, and laboratory methods for simulation, prototyping, testing, fabrication, and data analysis.
- Evaluate and interpret biomedical data, including biosignals, imaging, and computational models, to inform clinical or engineering decisions.
- Apply professional standards, ethics, and regulatory frameworks relevant to biomedical engineering practice and medical device development.
- Demonstrate effective teamwork, project management, documentation, and communication across professional engineering settings.
- Conduct independent research or design investigations, critically analysing evidence and generating justified engineering conclusions.
- Reflect on personal engineering practice to identify learning needs and contribute to continuous improvement.

These outcomes fully align with Engineers Australia Stage 1 outcomes and reflect the expectations for AQF Level 9 (Masters) graduates.

4. Continuous Improvement

The specialisation will be continuously refined through structured feedback loops. Key mechanisms include:

- **Industry and Professional Input.** Regular engagement with the Industry Advisory Committee and the College of Biomedical Engineers (Engineers Australia) will ensure alignment with professional standards and emerging technologies.
- **Graduate and Employer Feedback.** Surveys and interviews will inform curriculum updates to meet evolving workplace expectations.

- **Benchmarking and Research Integration.** Comparative reviews against leading programs and incorporation of UNSW research strengths will keep the curriculum cutting edge.
- **Data-Driven Review.** Analysis of student performance, progression and myExperience feedback will identify areas for improvement.
- **Technology and Trend Monitoring.** Advances in the discipline, such as AI, digital health, and regenerative medicine, will guide elective offerings.

5. Review Process

UNSW's Academic Offering Review and Monitoring Procedure outlines a structured approach to maintaining the quality and relevance of academic programs and courses. It includes both program-level and course-level review processes, with defined responsibilities and timelines.

Program Monitoring is conducted annually for all programs and specialisations. A comprehensive program review must occur at least once every five years for accredited programs, and every seven years for others. These reviews include a self-evaluation report (SER), review panel, review event, and a formal response with an implementation plan. Oversight is provided by the Academic Board and University Academic Quality Committee (UAQC), with input from Faculty Education Committees and Deans.

Course Review within UNSW Engineering is managed through a two-tiered process: Routine Course Review and Comprehensive Course Review. Routine reviews are conducted at the end of each term by Schools, using data such as enrolment, assessment outcomes, academic integrity issues, WAM differences, and student feedback (myExperience). Courses flagged through this process are added to the Comprehensive Course Review roster.

Comprehensive Course Reviews are detailed evaluations led by the Course Convenor in collaboration with a Faculty Educational Developer, Nexus Fellow, or Senior Academic. These reviews assess course design, pedagogy, alignment with learning outcomes, and feedback mechanisms. Outcomes are documented in a Course Development Plan and an Evaluation Report following the next course delivery. Schools must review at least 10% of their courses annually.

Stakeholder involvement spans multiple levels, including the Academic Board, UAQC, Faculty and School committees, Course Convenors, and external contributors such as students and professional bodies.

Frequency of updates includes termly course reviews, annual program monitoring, and five-yearly comprehensive reviews for accredited programs.

6. Curriculum Mapping

The School of Biomedical Engineering adopted a systematic process to set, review, and verify achievement of learning outcomes across the program. This process ensured alignment from Specialisation Learning Outcomes (SLOs) to Program Level Outcomes (PLOs) (Table 1), that align with Engineers Australia Stage 1 Competency Standards; from Course Learning Outcomes (CLOs) to SLOs and courses to SLOs (Table 2).

Process Overview:

1. **Setting Outcomes.** Program-level outcomes were derived from Engineers Australia Stage 1 Competencies and UNSW graduate attributes. Specialisation Learning Outcomes articulated discipline-specific capabilities, and CLOs were designed to progressively build these competencies through individual courses.

2. **Alignment and Mapping.** Each course underwent curriculum mapping to confirm its CLOs contributed directly to SLOs and PLOs. Tables 1-2 demonstrate these relationships. Based on the CLO-SLO mapping, an overall map of each course to each SLO was done (Table 2)
3. **Assessment Integration.** Assessment tasks are explicitly linked to CLOs in ECLIPs, with grading criteria designed to validate achievement of intended learning outcomes. This ensures that evidence of student performance support assurance of learning at the program level.
4. **Review and Verification.** Achievement of outcomes will be verified through:
 - a. **Annual course reviews**, using assessment data and student feedback.
 - b. **Program-level monitoring**, aggregating evidence from multiple courses to confirm attainment of SLOs and PLOs.
 - c. **Comprehensive reviews every five years**, incorporating stakeholder input and benchmarking against national and international standards.
5. **Continuous Improvement.** Findings from mapping and review informed curriculum adjustments, ensuring ongoing alignment with accreditation requirements and industry expectations.



Table 1. Mapping of the specialisation learning outcomes to the program level outcomes

SLO/PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	PLO15	PLO16
1. Apply in-depth and broad specialist biomedical engineering knowledge	x	x	x													
2. Analyse contextual factors impacting biomedical engineering					x											
3. Apply engineering techniques, tools, and resources to solve complex problems in medicine							x	x								
4. Apply systematic approaches to carrying out engineering design and projects									x	x				x		
5. Discern, synthesise and critically evaluate knowledge development and research directions within biomedical engineering to inform their practice				x												
6. Exhibit a respect for, and understanding of, professional practice in biomedical engineering						x				x				x		
7. Effectively communicate with all stakeholders in a professional manner											x					
8. Apply critical thinking and self-reflective practices for effective management of self and others in teamwork													x		x	x

Table 2. Overall mapping of courses to the specialisation learning outcomes based on mapping of individual CLOs to the SLOs

Course code	1. Apply in-depth and broad specialist biomedical engineering knowledge	2. Analyse contextual factors impacting biomedical engineering	3. Apply engineering techniques, tools, and resources to solve complex problems in medicine	4. Apply systematic approaches to carrying out engineering design and projects	5. Discern, synthesise and critically evaluate knowledge development and research directions within biomedical engineering to inform their practice	6. Exhibit a respect for, and understanding of, professional practice in biomedical engineering	7. Effectively communicate with all stakeholders in a professional manner	8. Apply critical thinking and self-reflective practices for effective management of self and others in teamwork
Core Courses								
BIOM9551	Proficient	Developed	Developed	Proficient	Proficient	Developed	Proficient	Developed
BIOM9660	Developed	Developed	Developed	Proficient	Developed	Proficient	Proficient	Developed
BIOM9333	Proficient	Proficient	Proficient	Proficient	Proficient	Developed	no alignment	Proficient
Disciplinary Electives								
ANAT2511	Proficient	Developed	Developed	Developed	Proficient	Proficient	Developed	Proficient
BIOM9310	Proficient	Proficient	Proficient	Developed	Developed	Proficient	Proficient	Introduced
BIOM9410	Developed	Proficient	Developed	Developed	Developed	Proficient	Proficient	Proficient
BIOM9420	Proficient	Developed	Proficient	Developed	Proficient	Developed	Proficient	Proficient
BIOM9561	Developed	Developed	Developed	Introduced	Developed	Developed	Developed	Developed
BIOM9610	Proficient	Introduced	Developed	Developed	Introduced	no alignment	Developed	Introduced
BIOM9640	Proficient	Developed	Proficient	Developed	Proficient	Developed	Proficient	Developed

BIOM9910	no alignment	Developed	no alignment	Developed	Developed	Developed	Proficient	Proficient
BIOM9920	Proficient	Proficient	Proficient	Developed	Proficient	Developed	Proficient	Proficient
PHSL2121	Proficient	Developed	Proficient	Developed	Proficient	Developed	Developed	Proficient
PHSL2221	Proficient	Developed	Proficient	Developed	Proficient	Proficient	Developed	Proficient
Advanced Disciplinary Electives								
BINF9020	Proficient	Developed	Proficient	Proficient	Proficient	Developed	Proficient	Proficient
BIOM9027	Developed	Developed	Proficient	Proficient	Developed	no alignment	no alignment	Developed
BIOM9311	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	no alignment	Proficient
BIOM9332	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	no alignment	Proficient
BIOM9333	Proficient	Proficient	Proficient	Proficient	Proficient	Developed	no alignment	Proficient
BIOM9450	Proficient	Developed	Proficient	Proficient	Developed	Developed	Introduced	Developed
BIOM9541	Proficient	Proficient	Proficient	Proficient	Proficient	Introduced	Developed	Proficient
BIOM9551	Proficient	Developed	Developed	Proficient	Proficient	Developed	Proficient	Developed
BIOM9621	Proficient	Developed	Developed	Developed	Developed	Developed	Developed	Developed
BIOM9650	Proficient	Developed	Proficient	Developed	Proficient	Introduced	Developed	Developed
BIOM9660	Developed	Developed	Developed	Proficient	Developed	Proficient	Proficient	Developed
BIOM9701	Developed	Introduced	Proficient	Developed	Introduced	Introduced	no alignment	no alignment
BIOM9711	Proficient	Proficient	Proficient	Proficient	Developed	Introduced	no alignment	Developed
MECH9650	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
Engineering and Technical Management Electives								
COMP9021	Developed	Developed	Proficient	Proficient	Developed	Developed	Proficient	Developed
GSOE9210	Developed	Proficient	Proficient	Proficient	Proficient	Developed	Developed	Proficient
GSOE9220	Developed	Proficient	Developed	Proficient	Developed	Proficient	Proficient	Proficient
GSOE9360	Developed	Developed	Developed	Developed	Developed	Proficient	Proficient	Proficient
GSOE9445	Developed	Proficient	Developed	Developed	Proficient	Proficient	Developed	Developed
GSOE9510	Developed	Proficient	Introduced	Developed	Developed	Proficient	Proficient	Proficient
GSOE9712	Developed	Proficient	Proficient	Proficient	Proficient	Developed	Proficient	Proficient
GSOE9820	Developed	Proficient	Proficient	Proficient	Proficient	Developed	Proficient	Proficient
GSOE9830	Developed	Proficient	Proficient	Developed	Proficient	Developed	Developed	Proficient
MATH5165	Developed	Developed	Proficient	Proficient	Developed	Introduced	Proficient	Proficient
MATH5846	Developed	Developed	Proficient	Developed	Proficient	Introduced	Developed	Proficient



Research Core Courses								
BIOM9020	Developed	Introduced	Developed	Developed	Developed	no alignment	Developed	Developed
BIOM9021	Proficient	Developed	Proficient	Proficient	Proficient	no alignment	Proficient	Proficient
BIOM9914	Proficient	Developed	Proficient	Proficient	Proficient	no alignment	Proficient	Proficient



7. Assessments

The program adopted a structured approach to assessment to ensure validity, integrity, and alignment with Engineers Australia Stage 1 Competency Standards. The design of assessment tasks and grading schema was intended to verify achievement of course-level outcomes (CLOs), specialisation learning outcomes (SLOs), and program-level outcomes (PLOs).

Key Features of the Assessment Approach:

- **Alignment and Verification.** Each assessment task was mapped to CLOs, which in turn aligned with SLOs and PLOs. This ensures that evidence of student performance contributes to verifying graduate capabilities at the program level.
- **Diversity of Assessment Types.** As shown in Figures 1–3, the program incorporates a balanced mix of assessment types across the specialisation, core courses, and electives. This included written reports, design projects, laboratory work, presentations, and examinations, providing multiple opportunities for students to demonstrate technical and professional competencies.
- **Development of Reflective Practice.** Reflective activities are embedded strategically throughout the specialisation using a coordinated, scaffolded approach. These activities enable students to critically evaluate their learning and professional growth at key stages of their academic journey, developing self-awareness and adaptability. By integrating reflection throughout the specialisation, the program prepares students for lifelong learning and continuous professional development.
- **Critical Review, Self and Peer Assessment.** Group projects incorporate peer evaluation and self-assessment components to promote accountability, teamwork, and constructive feedback skills.
- **Approach to Generative AI.** The program adheres to UNSW’s guidelines for the responsible use of generative AI. Course convenors clearly communicate expectations for AI use within each course, tailoring permissions to the nature of the activity and its intended learning outcomes. This approach safeguards academic integrity while enabling students to engage with AI tools in a transparent, ethical manner that supports assurance of learning.
- **Assessment Integrity.** Measures such as plagiarism detection, demonstrations, and staged submissions are implemented to uphold integrity and authenticity of student work.
- **Grading Schema.** Grading criteria are designed to reflect achievement of intended learning outcomes, with rubrics providing clarity on expectations.

Figures 1–3 demonstrate the distribution of assessment types across the specialisation, core courses, and electives. These visualisations confirm a deliberate balance between formative and summative tasks, practical and theoretical assessments, and individual and collaborative work, supporting comprehensive development of graduate capabilities.

BIOMEDICAL ENGINEERING (8621)

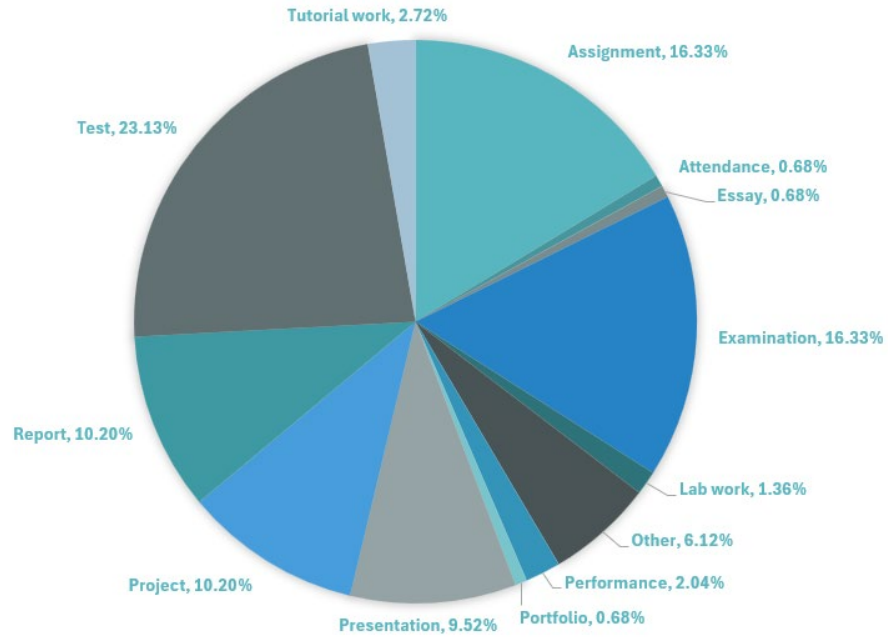


Figure 1 Percentage of assessment types used within the specialisation.

**BIOMEDICAL ENGINEERING (8621)
CORE**

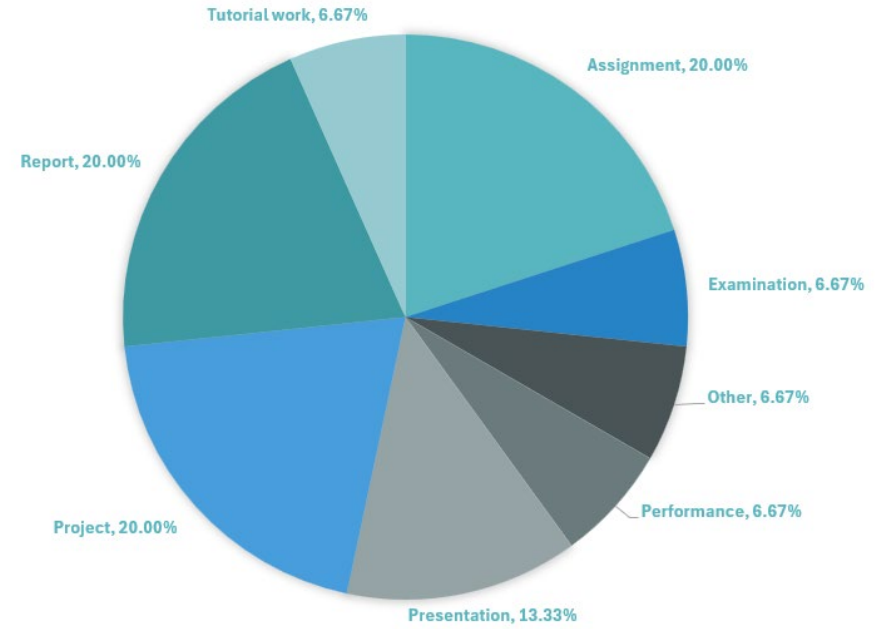


Figure 2 Percentage of assessment types used within the core of the specialisation.

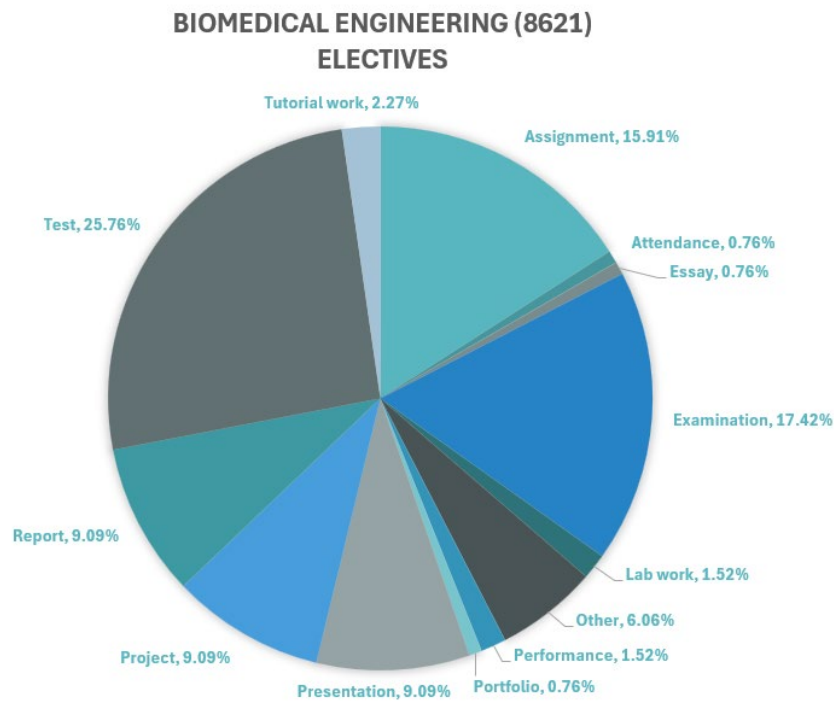


Figure 3 Percentage of assessment types used within the electives of the specialisation.

8. Specialisation Progression Plan

The School of Biomedical Engineering will monitor student progression and capability development through structured processes aligned with Faculty and University policies and procedures.

- **Curriculum Mapping and Assurance of Learning.** Each course is mapped to Engineers Australia Stage 1 Competencies and program learning outcomes. Assessment data will be reviewed annually to verify achievement of these outcomes.
- **Progression Monitoring.** Student progression will be tracked through academic performance indicators (e.g., WAM, academic standing, success) and flagged for intervention where necessary.
- **Integration with myPlan.** Students will be encouraged to use myPlan, UNSW's online progression checker and study planner, to plan their courses and track progress in real time. myPlan will provide visibility of prerequisites, historical term offerings, and recommended pathways, supporting informed decision-making and timely completion.
- **Review and Feedback Loops.** Aggregated assessment results and myExperience feedback will inform curriculum adjustments. Identified gaps in capability development will trigger targeted improvements in course design or support resources.
- **Integration with Program Reviews.** Findings from progression monitoring will feed into annual program monitoring and five-year comprehensive reviews, ensuring continuous alignment with accreditation standards and industry expectations.

Students can track their progression through the “myPlan” checker tool.

[myPlan | Current Students - UNSW Sydney](#)

A progression checklist and/or study plan is also available for students for the single degree and the double degree offerings.

[Progression checksheets & study plans | Engineering - UNSW Sydney](#)