UNSW Engineering

Education Specification

1. Program Overview

Program Title: Master of Engineering

Award Title: Master of Engineering (Electrical Engineering)

Engineering Discipline: Electrical Engineering

The Master of Engineering in Electrical Engineering (Program Code: 8621, Plan Code: ELECAS8621) is a two-year full-time postgraduate program requiring the completion of 96 Units of Credit (UoC). It is designed to build upon an existing undergraduate foundation in engineering, mathematics, and science, and extend students' expertise into advanced and specialist areas of electrical engineering. The program provides depth in areas such as signal processing, energy systems, control systems and electronics, while also incorporating professional development and technical management courses.

Its structure ensures that graduates develop both technical expertise and professional skills required for contemporary engineering practice.

The program is explicitly mapped to the Engineers Australia Stage 1 Competency Standard, ensuring graduates demonstrate:

- *Knowledge and Skill Base*: Advanced mastery of electrical engineering principles, including specialist in-depth technical knowledge in electrical energy systems, electronics, control systems and signal processing.
- *Engineering Application Ability*: Capacity to apply advanced theory to practice through discipline-specific design courses, laboratory work, and a substantial Master of Engineering project (12 UoC).
- *Professional and Personal Attributes*: Development of ethical awareness, teamwork, leadership, communication, and lifelong learning skills through Engineering Technical Management (ETM) courses and embedded professional practice requirements.

In terms of the rationale for program title and discipline focus, the title *Master of Engineering (Electrical Engineering)* reflects both the academic depth and professional orientation of the program:

- *Master of Engineering* indicates a two-year postgraduate program designed for advanced professional formation, incorporating significant design and project components.
- *Electrical Engineering* specifies the discipline focus, highlighting the program's emphasis on the generation, transmission, and application of electrical energy, as well as modern telecommunications, signal processing, control, and electronic systems.

2. Career Alignment

ELECAS8621 gives students a broad and deep foundation in engineering science — both theoretical and practical — that prepares them for a wide variety of career pathways across many established and emerging industry sectors. The curriculum progressively develops professional capabilities aligned with Engineers Australia Stage 1 Competencies, enabling graduates to transition effectively into professional practice and evolving industry expectations.

2.1. Alignment with Industry Sectors and Workforce Needs

ELECAS8621 equips students with knowledge and skills relevant to major engineering sectors in Australia and internationally, including:

- Power, Energy, and Utilities: Students gain depth in power circuits and systems analysis, power electronics and drives, protection, renewable energy integration, and grid management. Through laboratory work and design projects, graduates are prepared for roles in electricity generation, transmission, distribution, and renewable-energy deployment—key national priorities in energy transition and decarbonisation.
- Electronics, Embedded Systems, and Hardware Engineering: The curriculum provides comprehensive coverage of analogue/digital electronics, microcontrollers, embedded system design, instrumentation, and sensor technologies. Graduates are prepared for roles in consumer electronics, medical devices, industrial instrumentation, defence electronics, and advanced manufacturing.
- Control Systems, Automation, and Robotics: Students learn modern control theory, automation, and real-time systems, enabling them to work in industrial automation, robotics, smart manufacturing, mining technologies, space technologies and autonomous systems—high-demand sectors within Australian industry.
- Emerging Technologies and Cross-Disciplinary Fields: Through elective courses, research projects, and industry-linked activities, students engage with emerging areas such as smart grids, energy storage systems, electric vehicles, power-electronic conversion, smart cities, cybersecurity for critical infrastructure, and AI-enabled embedded systems. This ensures graduate readiness for rapidly evolving technologies and multidisciplinary environments.

2.2. Preparation for Professional Engineering Practice

ELECAS8621 structure ensures students progressively develop the capabilities expected of an entry-level professional engineer, through:

- Strong Engineering Science and Analytical Capability: Core courses ensure mastery of circuit theory, electromagnetics, signals and systems, electronics, power systems, and control — enabling graduates to analyse complex engineering problems and apply engineering methods with rigour.
- Design Skills and Systems Integration: Students undertake scaffolded design experiences culminating in a final-year thesis. These activities foster the ability to design, implement, and evaluate engineering solutions, integrating electrical engineering with software, mechanical, and communication subsystems.
- Laboratory, Simulation, and Practical Skills: Hands-on learning in laboratories, test environments, and computer-based modelling develops practical competence in measurement, instrumentation, prototyping, verification, and safety procedures — critical for work-readiness in industrial settings.
- Professional Conduct, Ethics, and Standards: The curriculum embeds engineering ethics, risk management, sustainable practice, WHS fundamentals, and exposure to relevant standards (e.g., AS/NZS, IEC, IEEE) to ensure graduates meet professional expectations and regulatory obligations.
- Teamwork, Communication, and Project Management: Students work in multidisciplinary teams and deliver industry-style technical communication, preparing them for professional collaboration, stakeholder engagement, and project delivery roles in consultancy, utilities, and engineering firms.

- Industry Engagement and Work-Integrated Learning: Industry placements, guest lectures, industry-led projects, and external collaborations give students exposure to real-world engineering environments, professional practices, and employer expectations.

2.3. Typical Career Pathways

ELECAS8621 graduates commonly progress into roles such as:

- Electrical Design Engineer – design electrical systems for industrial processing and manufacturing plants.
- Electronics Engineer – design smart tools, sensors, gadgets and robotics.
- Power Systems Engineer – design, manage and operate the electricity supply networks.
- Renewable Energy Engineer – work with sustainable solar, wind and battery systems.
- Control Systems Engineer – automate factories and smart tech.
- Embedded AI Engineer – integrate AI algorithms for real-time decision-making in devices like drones and autonomous vehicles.
- Satellite and Radar Engineer – build space and defence systems.
- Systems Engineer – infrastructure, defence, transport.
- Graduate Engineer – work in utilities, manufacturing, transport, mining, consulting, and technology sectors.
-

3. Specialisation Framework

The Specialisation Learning Outcomes (SLOs) were developed through rigorous internal consultations (School and Engineering Faculty). In the first stage at the school level, working groups were formed with members of academic teaching staff from various disciplinary areas to formulate the SLOs. The SLOs were reviewed by the School's Academic Executive Committee (AEC). External consultations were then sought from the School's Industry Advisory Board (IAB) for their advice and feedback, particularly the expectation of industry with regards to graduate capabilities. The Engineering Faculty Education Committee (FEC) reviewed and approved the SLOs before the final approval by the Faculty Board. The developed SLOs were shared and discussed with all teaching staff in the school through a School Board meeting. This consultative process ensured that the SLOs were not only academically rigorous but also aligned with industry expectations and Engineers Australia Stage 1 Competency Standards.

On successful completion of this specialisation, graduates will be able to:

SLO1. Demonstrate a deep understanding of advanced theory embodied in Electrical Engineering.

SLO2. Apply specialist in-depth technical knowledge in electrical energy systems, electronics, control systems, and/or signal processing.

SLO3. Identify, critically evaluate, and use current research to the solution of complex problems in Electrical Engineering.

SLO4. Think independently, critically, logically and apply analytical procedures and tools to develop complex hardware and software electrical systems.

SLO5. Proficiently apply self-directed learning, innovative problem-solving and design skills to open-ended electrical and interdisciplinary design challenges and the creation of products.

SLO6. Demonstrate a professional aptitude concerning the role of engineers in society and a well-developed, respectful, responsible ethic including safety, privacy, security, environmental concerns, and human rights.

SLO7. Communicate technical and non-technical concepts fluently and effectively with all stakeholders in document and verbal form, whether as part of a project team or in a leadership context.

The knowledge base developed in SLO1 directly supports the Stage 1 competency requirement for a sound and comprehensive grasp of underpinning and advanced engineering sciences. SLO2 ensures graduates can apply specialist technical knowledge to practical engineering problems, meeting the competency in engineering application ability. The integration of current research in SLO3 reflects professional trends towards innovation, adaptability, and evidence-based practice in modern engineering. The independent and critical thinking skills in SLO4 demonstrate attainment of competencies in analytical reasoning and the ability to manage complex systems. SLO5 highlights the importance of self-directed learning, creativity, and design innovation, ensuring graduates can address open-ended and interdisciplinary challenges. The professional aptitude and ethical responsibility emphasised in SLO6 align with industry and community needs for socially responsible engineers committed to safety, sustainability, privacy, and human rights. Finally, SLO7 ensures graduates meet the competencies in professional and personal attributes, becoming effective communicators and collaborators with diverse stakeholders in both technical and leadership contexts.

4. Continuous Improvement

The School of Electrical Engineering and Telecommunications (EE&T) has embedded a culture of continuous improvement into the design and delivery of the Master of Engineering (Electrical Engineering) specialisation. Program quality is assured through systematic evaluation of teaching practices, assessment integrity, industry feedback, and alignment with Engineers Australia (EA) Stage 1 Competency Standards.

Academic integrity is safeguarded through robust assessment processes, which are explained in detail in Section 7. To ensure academic integrity, all final exam papers are reviewed by another academic with relevant technical knowledge and then a final review of the papers is done by the Director of Academic Studies. Master of Engineering Project reports are submitted using Turnitin for checking against plagiarism, and they are blind marked by two academics to ensure consistency. A third assessor is utilised if there is a discrepancy larger than ten marks. For online written exams, various approaches have been adopted such as personalised exam papers or having a number of different versions. Some courses include an oral assessment as a compulsory component to pass the course. The markers are trained to identify plagiarism in the exams/reports and if anything identified, these are referred to the School Student Integrity Advisor, who meets with students before finalising an outcome. Plagiarism cases found are recorded in the university Plagiarism Register or Misconduct Register, the latter for serious cases. These measures demonstrate the School's commitment to continuous quality assurance and integrity in assessment practices, ensuring alignment with professional standards and community expectations.

Curriculum evaluation extends beyond coursework to include industrial engagement. The 60-day Industrial Training amounts to 480 hours in total as compared to the standard study load of 150 hours for a course. Thus, it is equivalent to 3 courses targeting mainly on EA's competencies 2 and 3, resulting in a more balanced overall curriculum alignment. The heatmap (Figure 4) provides a high-level, strategic view of the specialisation that will inform all future course and specialisation revisions. This systematic evaluation process ensures that program design remains responsive to industry needs, accreditation requirements, and future workforce demand.

Practical learning remains a cornerstone of the program. Laboratory work, which takes place every week in every technical course, accounts for a significant proportion of contact hours, ensuring students gain hands-on experience with real systems. In response to the post-pandemic shift toward online delivery, the School has invested in developing remote laboratory infrastructure, enabling students to access and control equipment through web-enabled interfaces. This award-winning innovation ensures that practical learning remains accessible and relevant, even in flexible delivery modes. It has been highly appreciated by students during covid as well as post-pandemic. The School already has a dedicated Learning and Teaching Innovation Laboratory and the aim will be to continue supplying it with the latest technologies for experimentation.

Continuous improvement is also driven by industry and community needs. Feedback from the Industry Advisory Board informs curriculum updates, ensuring graduates are prepared for evolving demands in areas such as renewable energy, digital communications, automation, and biomedical technologies. The program is regularly benchmarked against international standards and professional trends, ensuring that graduates remain competitive in global engineering markets.

Through these mechanisms, the Master of Engineering (Electrical Engineering) specialisation maintains a dynamic and responsive curriculum. Ongoing evaluation of assessment integrity, industry engagement, and technological innovation ensures that graduates are not only aligned with Engineers Australia Stage 1 competencies but also prepared to meet the challenges of future engineering practice.

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

Curriculum mapping for the Electrical Engineering specialisation (ELECAS8621) of the 8621 Master of Engineering program started at the course level and progressed to the specialisation level.

At the course level, the course coordinators develop their course outlines (COs) to articulate the course's context and relevance within the program. Each CO includes details about the course learning outcomes (CLOs) which lists the knowledge, attitudes, skills, and practices that students are expected to acquire and demonstrate after completing that course. Each CO also specifies the various assessments (exam, quiz, lab work, assignment, etc) and their alignment to validate attainment of the CLOs. UNSW Assessment Policy prescribes that each course can have up to four main assessment components of varying weightings, and each component may comprise several subcomponents. The assessment weightings and the mapping of the assessments to the CLOs are developed by the course coordinators and provided in the COs for transparency in the course design and assessment. Enterprise Course Outline System (ECOS), developed by UNSW, is used for generating the COs so that CLOs, assessments, and other key course information can be easily located, linked to the educational platform such as MOODLE. This ensures a consistent format across all the UNSW courses, including this specialisation.

The mapping of assessments to the course learning outcomes (CLOs) in all the core and elective course in the specialisation has been complied. To illustrate this, Fig. 1 shows a screenshot of some courses. It can be seen that assessments for most courses rely heavily on exams (mid-term and final). The other forms of assessments include take-home assignments, lab skills assessments and lab reports. Enquiry-based learning courses include thesis work and design proficiency that have various assessments like seminar presentations, design concept mapping, reports, poster presentation and design showcase.

At the specialisation level, the curriculum mapping was conducted in two stages.

CLO in a course were mapped to the SLOs with either introduced, developed, or proficient attainment levels. The CLO-SLO mappings for the courses were completed by the course convenors. The mappings were subsequently reviewed by the School educational team. Fig. 2 shows screenshot of the completed CLO–SLO mapping for some example courses .

Table 1. Mapping of SLOs to Engineers Australia Stage 1 Competencies

SLO/PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	PLO15	PLO16
1. Appreciation of the economic factors and drivers for the mining industry	X		X		X											
2. Embedded level of understanding and commitment to applying the principles of sustainable mining practices including socio-economic and environmental impacts	X		X		X	X		X								
3. Ability to plan, design, create, innovate, and manage rapidly changing technologies and complex datasets within the mining industry.		X	X	X	X		X	X					X			
4. Ability to take a holistic view of all systems within a mining operation through comprehensive technical engineering knowledge and skills.			X	X	X		X	X	X				X			
5. Advanced problem solving, analysis and synthesis skills and the ability to tolerate ambiguity.				X	X		X						X			
6. Ability to think and work individually as well as communicate and engage effectively with a diverse range of stakeholders.										X	X	X			X	X
7. Being resilient and adaptable to all forms of mining in changing conditions and multi-cultural environments (both national and international).					X	X				X				X		
8. Awareness and ongoing commitment to appropriate professional standards, the highest principles of ethical conduct, and lifelong learning.						X					X			X	X	
9. Commitment to a risk-based management approach and a strong safety culture.									X	X				X	X	

NOTE: [PLO1]Comprehensive theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering; [PLO2] Conceptual understanding of the mathematics, numerical analysis, statistics and computer and information sciences which underpin the engineering discipline: [PLO3] In-depth understanding of specialist bodies of knowledge within the engineering discipline; [PLO4] Discernment of knowledge development and research directions within the engineering discipline; [PLO5] Knowledge of engineering design practice and contextual factors impacting the engineering discipline; [PLO6] Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice; [PLO7]Application of established engineering methods to complex engineering problem solving; [PLO8]Fluent application of engineering techniques, tools and resources; [PLO9]Application of systematic engineering synthesis and design processes; [PLO10] Application of systematic approaches to the conduct and management of engineering projects; [PLO11] Ethical conduct and professional accountability; [PLO12] Effective oral and written communication in professional and lay domains; [PLO13] Creative, innovative and pro-active demeanour; [PLO14] Professional use and management of information; [PL15] Orderly management of self and professional conduct; [PL16] Effective team membership and team leadership.

Table 2. Completed CLO-SLO mapping

Course code	1. Appreciation of the economic factors and drivers for the mining industry	2. Embedded level of understanding and commitment to applying the principles of sustainable mining practices including socio-economic and environmental impacts	3. Ability to plan, design, create, innovate, and manage rapidly changing technologies and complex datasets within the mining industry.	4. Ability to take a holistic view of all systems within a mining operation through comprehensive technical engineering knowledge and skills.	5. Advanced problem solving, analysis and synthesis skills and the ability to tolerate ambiguity.	6. Ability to think and work individually as well as communicate and engage effectively with a diverse range of stakeholders.	7. Being resilient and adaptable to all forms of mining in changing conditions and multi-cultural environments (both national and international).	8. Awareness and ongoing commitment to appropriate professional standards, the highest principles of ethical conduct, and lifelong learning.	9. Commitment to a risk-based management approach and a strong safety culture.
Level 1 Core Courses									
DESN1000		Introduced	Introduced	Introduced	Introduced	Introduced		Introduced	Introduced
ENGG1300				Introduced	Introduced	Introduced			Introduced
ENGG1811					Introduced				
GEOS1111	Introduced	Introduced		Introduced	Introduced				
MATH1131					Introduced	Introduced			
MATH1141					Introduced	Introduced			
MATH1231					Introduced	Introduced			
MATH1241					Introduced	Introduced			
PHYS1121					Introduced				Introduced
PHYS1131					Introduced				Introduced
Level 2 Core Courses									
CEIC2001				Introduced	Introduced				
DESN2000	Developed	Developed	Developed	Developed	Developed	Developed	Introduced	Introduced	Developed
ENGG2400					Introduced	Developed			Developed
MATH2018					Developed				
MATH2019					Developed				
MATH2089					Developed				
MERE2810	Introduced		Introduced	Developed	Proficient			Introduced	Developed
MINE2820	Introduced	Introduced		Developed					
Level 3 Core Courses									
MINE3220	Proficient	Developed	Proficient	Proficient	Proficient	Proficient		Developed	Developed

MINE3230	Developed	Developed		Developed	Developed		Developed		Developed
MINE3310	Developed	Developed	Proficient	Developed	Proficient			Proficient	
MINE3430	Developed	Developed	Developed	Proficient	Developed		Introduced	Introduced	Developed
MINE3510	Developed	Developed	Proficient	Proficient	Developed		Proficient	Developed	Developed
MINE3630									
MINE3910	Developed	Proficient	Developed	Developed	Developed	Developed	Developed	Developed	Developed
Level 4 Core Courses									
MERE4951	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient		Proficient	Proficient
MERE4952	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient		Proficient	Proficient
MERE4953	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient		Proficient	Proficient
MINE4250	Proficient	Developed	Developed	Proficient	Proficient	Proficient	Developed	Developed	Developed
MINE4310	Developed	Developed	Proficient	Proficient	Proficient		Proficient	Developed	Proficient
MINE4710	Proficient	Developed	Developed	Proficient	Proficient		Proficient	Proficient	Proficient
Discipline Electives List									
ENGG2600	Introduced	Introduced	Developed		Introduced	Introduced		Introduced	Introduced
ENGG3001						Developed		Developed	
ENGG3600	Developed	Developed	Proficient		Developed	Developed		Developed	Developed
ENGG4600	Proficient	Proficient	Proficient		Proficient	Proficient		Proficient	Proficient
MERE8810	Proficient	Developed	Proficient	Developed	Proficient			Developed	Developed
MINE5040	Developed	Developed	Proficient	Developed	Proficient	Developed	Developed	Developed	Developed
MINE5050	Developed	Developed	Proficient	Proficient	Proficient				Proficient
MINE5060									
MINE8120	Developed	Proficient	Proficient	Proficient	Proficient	Developed	Proficient	Developed	Proficient
MINE8130	Developed	Developed	Developed	Developed	Proficient		Developed	Developed	Developed
MINE8680	Developed		Proficient		Proficient	Proficient			Proficient
MINE8710	Developed	Developed	Proficient	Proficient	Proficient			Developed	Proficient
MINE8870	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient		Proficient	Proficient
MINE8930	Proficient	Developed	Proficient	Proficient	Proficient				Proficient
MINE8940	Developed	Developed	Developed	Proficient	Proficient	Developed		Developed	Proficient
MINE8950	Developed	Proficient	Proficient	Developed	Proficient		Developed	Proficient	Proficient
MINE1010	Introduced	Introduced		Introduced		Introduced			

7. Assessments

7.1. Assessment types used within the specialisation

The mixture of assessment types used within the specialisation is shown below in Figs. 1-3.

As is typical of many postgraduate programs, early courses are content-driven and the assessments reflect a desire to see demonstration of individual learning in tests or examinations, while also incorporating advanced assignments that require critical engagement with current research and professional practice and industry-relevant case studies. Students commonly have opportunities for longer-form formative or summative assignment activities.

In later stages, the assessment mix tends to pivot towards research-informed project work, often in teams, and culminating in the substantial Master of Engineering Project (12 UoC). This project requires students to integrate technical knowledge, research skills, and professional competencies in a capstone experience.

It is noted in many courses, terms such as assignment, essay, report, and project are often used interchangeably. Similarly, exam and test, as well as presentation and performance, may refer to comparable forms of assessment. For example, a presentation based on a project might be categorized either as a project or as a presentation. Laboratory work may also be evaluated through reports, interviews, or presentations, and therefore may not always be explicitly labelled as “Laboratory”.

At this level, assessments are deliberately designed to emphasise independent learning, advanced problem-solving, and professional communication, ensuring graduates demonstrate Engineers Australia Stage 1 competencies at an advanced AQF Level 9 standard.

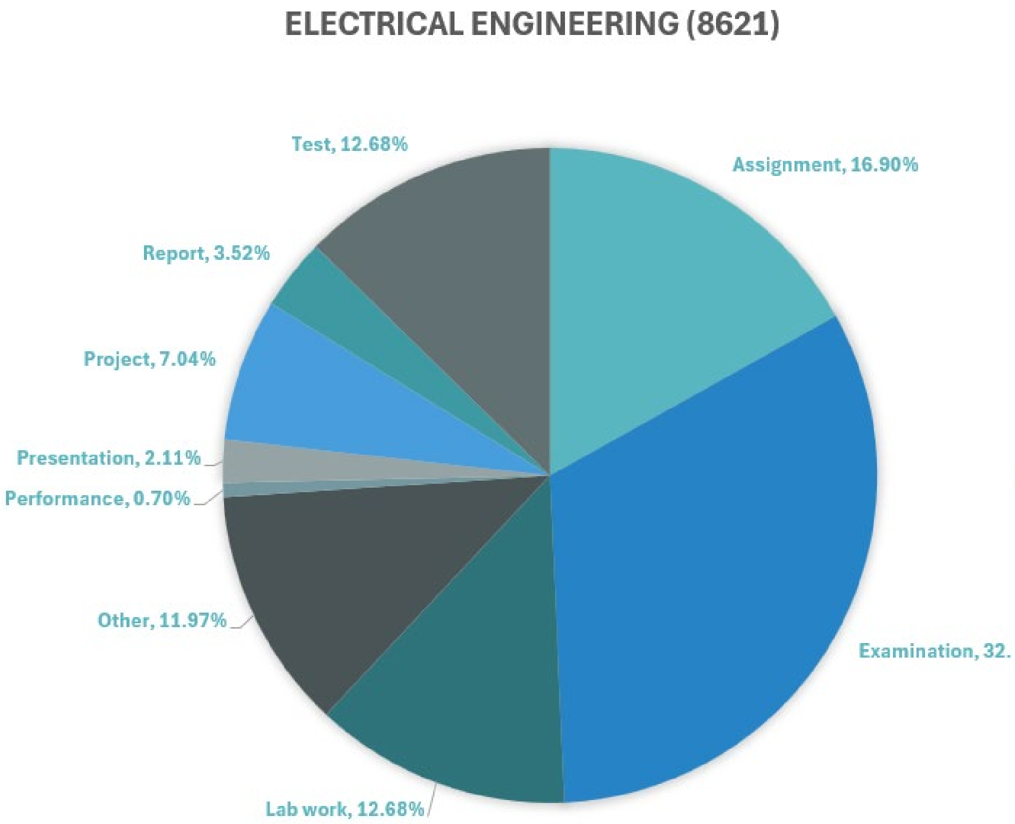

Fig. 1: Percentage of assessment types used within the specialisation.

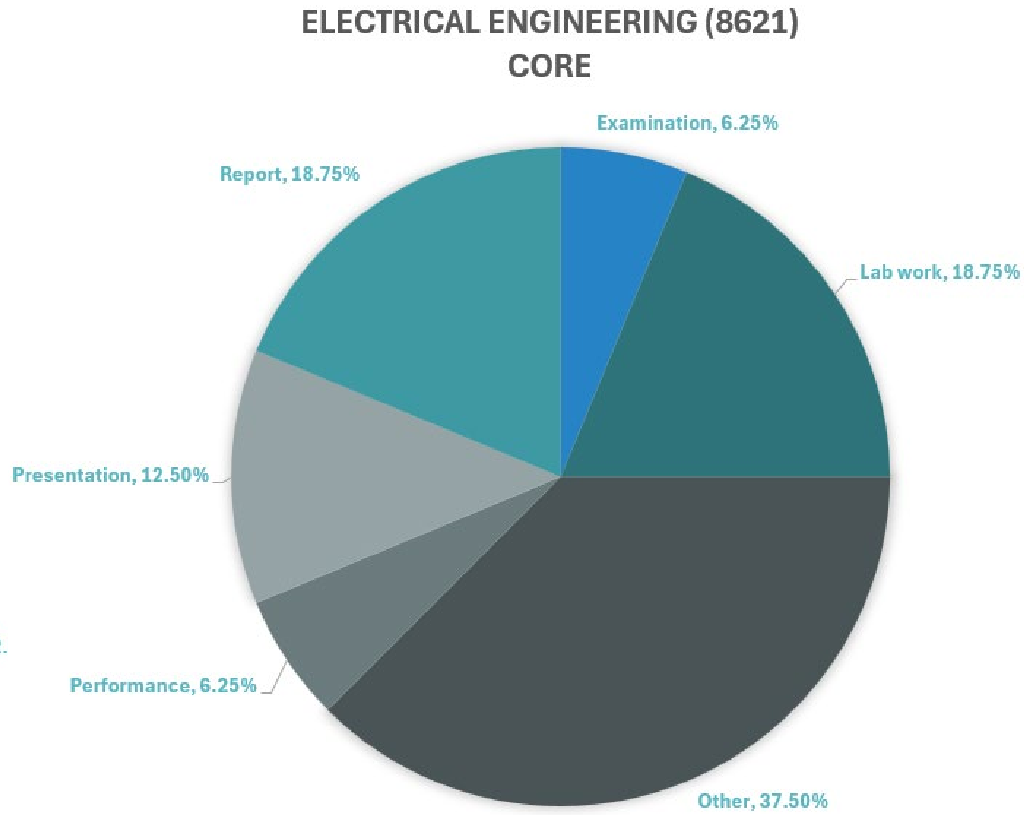

Fig. 2: Percentage of assessment types used within the core of the specialisation.

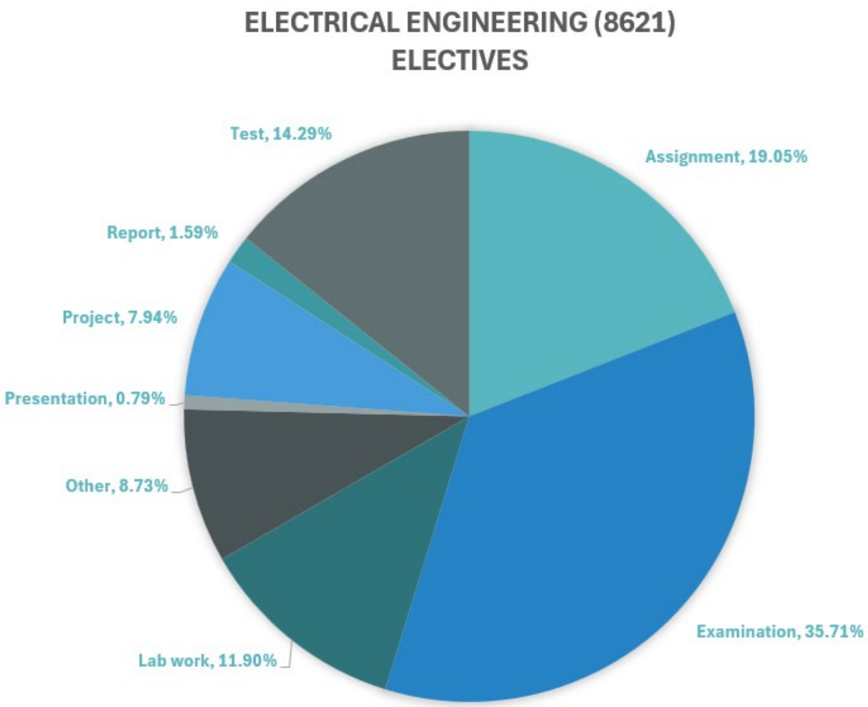

Fig. 3: Percentage of assessment types used within the electives of the specialisation.

7.2. Alignment of assessment and grading with learning outcomes and graduate capabilities

The School of EE&T employs a comprehensive and integrated assessment strategy to ensure that students achieve the intended learning outcomes at the course level and demonstrate the graduate capabilities required by Engineers Australia. This strategy is underpinned by deliberate alignment between course-level learning outcomes (CLOs), assessment tasks, and program-level learning outcomes (PLOs), ensuring a coherent and cumulative learning experience across the program.

Assessment tasks within each course are designed to directly target specific CLOs. These tasks span a diverse range of formats—including laboratory work, design projects, programming assignments, oral presentations, quizzes, and examinations—to capture the breadth of skills and knowledge expected of engineering graduates. The variety ensures that students are assessed not only on their theoretical understanding but also on their ability to apply concepts in practical, real-world contexts.

In order to ensure the alignment between CLOs and assessment, every course outline includes a explicit mapping of CLOs to assessment tasks. This mapping ensures that all CLOs are assessed through one or more appropriately designed tasks, providing multiple opportunities for students to demonstrate their competence. This alignment is documented and made transparent to students, reinforcing the purpose of each assessment and how it contributes to their overall development. It also enables academic staff to systematically monitor and ensure comprehensive coverage of learning outcomes across the curriculum.

To support consistency and fairness in evaluation, each assessment task is accompanied by a detailed grading schema or rubric. These rubrics articulate clear performance criteria aligned with UNSW's academic standards and/or Engineers Australia's Stage 1 Competency Standards. Students are provided with these rubrics in advance, promoting transparency and helping them understand the expectations for success. Moderation processes—including peer review of assessment instruments, calibration of marking, and analysis of grade distributions—are routinely implemented to ensure reliability and equity across different offerings and delivery modes.

Graduate capability validation is achieved through the aggregation of assessment data across the program. The substantial Master of Engineering Project (12 UoC) and integrative courses such as ELEC9123 – Design Proficiency serve as critical points where students demonstrate the synthesis of knowledge, problem-solving, communication, teamwork, and ethical practice. These experiences are mapped to program-level learning outcomes, which in turn align with Engineers Australia's graduate attributes. Evidence of student attainment is collected through embedded assessments and reflective activities and is reviewed as part of the School's ongoing quality assurance and curriculum review processes.

This continuous improvement framework is supported by regular stakeholder engagement—including feedback from students, industry partners, and alumni—as well as benchmarking against national and international standards. These inputs inform the refinement of assessment strategies, ensuring that they remain aligned with evolving professional expectations and continue to support the development of capable, work-ready graduates at the postgraduate (AQF Level 9) standard.

7.3. Reflective practice and standards-based self-assessment

In terms of reflective practice and self-assessment processes, these are embedded throughout the program to support students in tracking their progressive attainment of graduate capabilities. These processes are explicitly referenced to relevant standards and benchmarks, including Engineers Australia's Stage 1 Competency Standards and UNSW's program-level learning outcomes, ensuring that students develop a clear understanding of their growth and readiness for professional practice.

Reflective activities are integrated into multiple courses across the program, particularly in design projects and laboratory work. Students are encouraged to critically evaluate their own performance, identify areas for improvement, and articulate how their learning aligns with the expected graduate capabilities. These reflections often take the form of structured journals, post-assessment reviews, peer evaluations, and guided prompts that link personal development to specific learning outcomes.

Self-assessment is further supported by rubrics and capability frameworks that are shared with students at the beginning of each course. These tools allow students to benchmark their progress against defined performance criteria and graduate attributes. At this level, self-assessment is emphasised in advanced coursework and research activities, where students compare their perceived competence with instructor feedback and industry expectations. This includes reflective milestones embedded in the Master of Engineering Project (12 UoC), where students critically evaluate their research progress and professional development.

Capstone courses and industry-linked experiences provide additional opportunities for reflective practice. Students are required to submit reflective reports that explicitly address how their project work demonstrates attainment of Engineers Australia's competencies, including advanced problem-solving, communication, teamwork, and ethical responsibility. These reflections are assessed not only for content but also for the student's ability to critically engage with professional standards and articulate their readiness for graduate practice at AQF level 9.

These reflective and self-assessment practices are reviewed regularly as part of the School's quality assurance processes. Feedback from students, academic staff, and industry stakeholders informs the continuous enhancement of these mechanisms to ensure they remain meaningful, standards-aligned, and effective in preparing students for professional engineering roles.

7.4. Approaches to the use of generative AI and assessment integrity

The program recognises the growing influence of generative AI tools in engineering education and practice. Assessment tasks are structured to minimise risks of academic misconduct while encouraging authentic engagement. Strategies include:

- Emphasis on problem solving, design justification, and reflective commentary that require individual reasoning beyond AI outputs.
- Use of oral presentations, in class demonstrations, and iterative submissions to verify student ownership of work.
- Clear marking rubrics that reward critical review of AI-assisted content rather than passive reproduction.

By embedding reflection on AI use within assessment, students develop awareness of ethical responsibilities, intellectual property considerations, and professional accountability. This approach also ensures that while students gain familiarity with emerging technologies, assessment integrity is preserved, and graduate capabilities in critical thinking, reflective practice, and ethical judgment are strengthened.

In advanced courses, generative AI may be used for drafting, simulation, or coding support, but all use must be explicitly acknowledged. Integrity is safeguarded through oral presentations, lab demonstrations, and/or iterative submissions that confirm student ownership of work. Alternatively, AI can assist with background research or brainstorming, but students must critically reflect on its reliability, ethical implications, and alignment with Engineers Australia's professional responsibility standards. At Master's level, students are expected to critically evaluate the role of generative AI in advanced engineering practice, considering its limitations, ethical implications, and potential applications in research and industry.

8. Specialisation Progression Plan

The programs offered by the School of EE&T are designed to progressively cultivate student autonomy, critical thinking, and lifelong learning skills. The curriculum scaffolds independent learning, reflective practice, peer and self-assessment across all stages of the program, ensuring students are well-prepared for professional engineering practice. Progression plans are embedded throughout the curriculum, providing students with clear developmental milestones and documented pathways that allow both staff and students to monitor capability growth from foundational knowledge to advanced professional practice.

Year 1: Building Advanced Foundations for Independent Learning

In the first year of the Master's program, students engage with structured learning environments that consolidate core engineering principles while extending into advanced topics. For example, courses in signal processing, control systems and energy systems introduce students to reflective learning through structured feedback during laboratory evaluations and iterative project work. Progression plans at this stage emphasise the consolidation of high-level undergraduate knowledge and the initial development of advanced reflective practice, enabling students to track their movement from guided learning to independent inquiry at postgraduate level.

Year 2: Developing Critical Review and Reflective Practice

The second year focuses on synthesising technical knowledge with independent project execution and professional practice. Examples of key courses include:

- ELEC9123 – Design Proficiency represents a pivotal capstone experience in the Master of Engineering (Electrical Engineering) program, where students transition from structured postgraduate coursework into independent, professionally oriented practice. This postgraduate course draws on the advanced theoretical knowledge and practical skills gained in prior undergraduate study and early Master's coursework. It does not focus on teaching the design process itself but instead requires students to apply their accumulated expertise to complex design tasks across areas such as electronic circuits, signal processing, control systems, power systems, and telecommunications. The course requires students to integrate knowledge to deliver design projects on different disciplines, exercising autonomy in problem definition, solution development, and project management. By engaging with open-ended, industry relevant challenges, students critically evaluate technical options, reflect on their decision-making processes, and assume responsibility for outcomes. This progression into capstone work fosters professional judgment, self-assessment, and autonomy at the AQF Level 9 postgraduate standard.

- ELEC9451/ELEC9452/ELEC9453– Masters Project A/B/C require students to undertake substantial postgraduate-level individual research or advanced design projects. These include:
    - Independent planning and execution of complex engineering investigations that demonstrate advanced technical and research capability.
    - Critical literature review and synthesis of current research.
    - Formal self-assessment and reflection on project outcomes.
    - Peer feedback during oral presentations and poster sessions.
    - Integration of advanced theoretical knowledge with practical application, ensuring alignment with AQF Level 9 expectations and Engineers Australia Stage 1 Competency Standards.

These culminating experiences demonstrate students' capacity for autonomous learning, critical review, and professional self-awareness. Progression plans in the final year serve as a comprehensive record of graduate capability development. This ensures that students, staff, and accrediting bodies can clearly track the trajectory of professional growth across the program, confirming readiness for Engineers Australia Stage 1 Competency Standards at AQF Level 9.

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]