UNSW Engineering

Education Specification

1. Program Overview

Program Title: Master of Engineering

Award Title: Master of Engineering (Telecommunications)

Engineering Discipline: Telecommunications

The Master of Engineering in Telecommunications Engineering (Program Code: 8621, Plan Code: TELEAS8621) 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 telecommunications engineering. The program provides depth in areas such as digital communications, wireless systems, optical networks, and network performance, 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 telecommunications engineering principles, including specialist in-depth technical knowledge in digital modulation, wireless communication technologies, optical systems and network architectures.
- *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 (Telecommunications)* 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.
- *Telecommunications Engineering* specifies the discipline focus, highlighting the program's emphasis on communication systems, wireless and optical technologies, and modern network architectures.

2. Career Alignment

TELEAS8621 gives students a broad and deep foundation in telecommunications engineering, both theoretical and practical, that prepares them for a wide variety of career pathways across established and emerging communications and digital-infrastructure sectors. The curriculum progressively develops professional capabilities aligned with the Engineers Australia Stage 1 Competency Standards, enabling graduates to transition effectively into professional practice and to respond to evolving industry expectations in networked and communication-centric systems.

2.1. Alignment with Industry Sectors and Workforce Needs

TELEAS8621 equips students with knowledge and skills relevant to major telecommunications and digital-infrastructure sectors in Australia and internationally, including:

- Telecommunications Networks and Service Providers: TELEAS8621 equips students with knowledge and skills aligned with the key telecommunications and digital infrastructure sectors in Australia and internationally. The specialisation emphasises system-level telecommunications engineering, underpinned by communication theory, networking, signal processing, design, and professional practice. Depth and specialisation are further supported through Level 5 (Advanced Disciplinary) electives, allowing students to tailor their learning to specific industry sectors, subject to elective availability. Core training in signals and systems, communication theory, wireless systems, and network fundamentals prepares graduates for roles in telecommunications areas essential to Australia’s digital-infrastructure growth.

- Wireless and Mobile Communications: The program develops strong foundations in digital communications, wireless communication systems, modulation and coding, and network-level analysis. These capabilities support graduate roles related to mobile and wireless network planning, deployment, optimisation, and performance evaluation. Through Level 5 electives, students may pursue advanced study in areas such as advanced wireless systems, microwave communications, and related technologies, aligning with evolving mobile communication environments and industry needs.

- Telecommunications Service Providers and Network Operators: Graduates are prepared for roles in planning, deploying, operating, and optimising large-scale communication networks, including mobile, fixed, and optical infrastructures. Core study areas such as communication systems, signal processing, switching systems, network architectures, and network performance analysis align directly with workforce needs in national carriers, infrastructure providers, and enterprise telecommunications environments. Advanced Disciplinary electives provide greater depth in specialised network technologies, where offered.

- Internet, Data, and Networked Infrastructure: The curriculum provides a firm grounding in networking principles, communication protocols, and system-level network performance and reliability. These skills are relevant to roles supporting enterprise networks, service provider infrastructure, and large-scale networked systems. Exposure to advanced networking concepts may be expanded through Level 5 electives and project work, subject to availability.

- Critical Infrastructure, Satellite, and Mission-Critical Communications: TELEAS8621 prepares graduates to contribute to the design and operation of reliable and resilient communication systems used in critical infrastructure contexts such as utilities, transport, defence support, and emergency services. Emphasis on system reliability, network performance, and professional engineering judgement supports readiness for mission-critical communications roles. Where offered, Level 5 electives provide opportunities for students to develop advanced knowledge in areas such as microwave systems or satellite communications, supporting specialised career pathways without assuming universal coverage across all graduates.

2.2. Preparation for Professional Engineering Practice

The TELEAS8621 structure ensures students progressively develop the capabilities expected of an entry-level professional telecommunications engineer through:

- Strong Engineering Science and Analytical Capability: Core courses ensure mastery of communication theory, information theory, digital signal processing, networking fundamentals, and system-level analysis, enabling graduates to analyse complex telecommunications problems with rigour.
- Design Skills and Systems Integration: Students undertake scaffolded design experiences culminating in the Design Proficiency course and a substantial Master of Engineering Project. These activities foster the ability to design, integrate, and evaluate complex communication and networking systems.
- Laboratory, Simulation, and Practical Skills: Hands-on learning in laboratories and simulation environments develops practical competence in measurement, modelling, system verification, performance evaluation, and safe engineering practice—critical for work-readiness in telecommunications and network engineering roles.
- Professional Conduct, Ethics, and Standards: The curriculum embeds engineering ethics, risk management, sustainable practice, and exposure to relevant standards and regulatory frameworks (e.g. IEEE, ITU-T, ACMA), ensuring graduates meet professional and regulatory expectations.
- Teamwork, Communication, and Project Management: Students work in multidisciplinary teams and deliver industry-style technical documentation and presentations, preparing them for professional collaboration, stakeholder engagement, and project delivery roles.
- Industry Engagement and Work-Integrated Learning: Mandatory industrial training, guest lectures, industry-linked projects, and external collaborations provide students with exposure to real-world engineering environments, professional practices, and employer expectations.

9.3 Typical Career Pathways

TELEAS8621 graduates commonly progress into roles such as:

- Telecommunications Engineer – design, implement, and maintain communication systems and network infrastructure.
- Network Design or Planning Engineer – plan, model, and optimise mobile, fixed, and enterprise communication networks.
- Network Operations Engineer – monitor, manage, and improve network performance, reliability, and availability.
- Wireless or Radio Communications Engineer – support wireless access networks and radio-based communication systems.
- Communications Systems Engineer – design and integrate communication subsystems within larger engineered systems.
- Systems Integration Engineer – integrate hardware, software, and network components in complex telecommunications environments.
- Telecommunications Project Engineer – manage and deliver telecommunications and digital-infrastructure projects.
- Graduate Engineer – work across telecommunications service providers, network operators, infrastructure organisations, consulting firms, and technology companies. Graduates may also

pursue more specialised roles, depending on elective selection, project focus, and industry experience, including:

- Satellite Communications Engineer – specialised roles in satellite or microwave communications, supporting space, defence, and remote-area connectivity applications.
- IoT Systems Engineer – roles supporting networked and interconnected communication systems, with further specialisation depending on elective and project choices.
- Cybersecurity / Network Security Engineer – roles involving network reliability, performance, and professional responsibility within telecommunications and digital-infrastructure environments.
- Wireless or Network-Focused Engineer – advanced wireless, mobile, or network-centric engineering roles aligned with system-level telecommunications expertise.

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 Telecommunications Engineering.

SLO2. Apply specialist in-depth technical knowledge in telecommunications and networking protocols.

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

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

SLO5. Proficiently apply self-directed learning, innovative problem-solving and design skills to open-ended telecommunications 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 (Telecommunications 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 (Telecommunications 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 Telecommunications specialisation (TELEAS8621) 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 list the knowledge, attributes, 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 the CLOs to the different assessment types in all the core and elective courses in the specialisation has been compiled..

At the specialisation level, the curriculum mapping was conducted in two stages. An Excel-based mapping tool—developed specifically for mapping the CLOs of all core and elective courses in the TELEAS specialisation to the seven SLOs—was used. This tool allows each CLO in a course to be 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.

Table 1. Mapping of SLOs to PLOs (Engineers Australia Stage 1 Competency elements)

SLO/PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	PLO15	PLO16
1. Demonstrate a deep understanding of advanced theory embodied in Telecommunications Engineering.	X	X	X				X									
2. Apply specialist in-depth technical knowledge in telecommunications and networking protocols.		X	X				X		X							
3. Identify, critically evaluate, and use current research to the solution of complex problems in Telecommunications Engineering.			X	X			X									
4. Think independently, critically and logically to apply tools and analytical procedures to develop complex hardware and software telecommunications and networking systems.			X		X		X	X	X							
5. Proficiently apply self-directed learning, innovative problem-solving and design skills to open-ended telecommunications and interdisciplinary design challenges and the creation of products.						X	X	X	X					X		
6. 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.					X	X				X	X		X	X	X	X
7. 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.				X						X		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. Demonstrate a deep understanding of advanced theory embodied in Telecommunications Engineering.	2. Apply specialist in-depth technical knowledge in telecommunications and networking protocols.	3. Identify, critically evaluate, and use current research to the solution of complex problems in Telecommunications Engineering.	4. Think independently, critically and logically to apply tools and analytical procedures to develop complex hardware and software telecommunications and networking systems.	5. Proficiently apply self-directed learning, innovative problem-solving and design skills to open-ended telecommunications and interdisciplinary design challenges and the creation of products.	6. 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.	7. 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.
Analysis and Design Core Courses							
ELEC9123 Design Proficiency	Developed	Proficient	Proficient	Proficient	Proficient	Developed	Proficient
ELEC9451 Masters Project A		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
ELEC9452 Masters Project B		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
ELEC9453 Masters Project C		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
Engineering and Technical Management Electives							
GSOE9210 Engineering Decision Structures				Introduced		Proficient	Developed
GSOE9445 Entrepreneurial Engineering						Proficient	Developed
GSOE9510 Ethics and Leadership in Engineering						Proficient	Proficient
GSOE9820 Engineering Project Management						Developed	Developed
GSOE9830 Economic Decision Analysis in Engineering				Developed		Proficient	Proficient
Level 4 Electives							
ELEC4621 Advanced Digital Signal Processing	Developed	Introduced	Introduced	Developed	Introduced		Developed
PHTN4661 Optical Circuits and Fibres	Developed	Developed	Developed	Introduced	Developed		Developed
PHTN4662 Photonic Networks	Developed	Developed	Developed	Introduced	Developed		Developed
TELE4642 Network Performance	Proficient	Proficient	Proficient	Proficient	Developed	Developed	Developed

TELE4651 Wireless Communication Technologies	Proficient	Proficient	Developed	Proficient	Proficient	Developed	Proficient
TELE4652 Mobile and Satellite Communications Systems	Developed	Developed	Proficient	Proficient	Proficient	Developed	Developed
TELE4653 Digital Modulation and Coding	Proficient	Proficient	Developed	Developed	Developed	Developed	Proficient
Level 5 Electives							
ELEC9725 Satellite Navigation: Systems, Signals & Receivers	Proficient	Proficient	Proficient	Proficient	Proficient	Developed	Proficient
ELEC9741 Electrical Engineering Data Science	Proficient	Proficient	Proficient	Proficient	Proficient	Developed	Developed
ELEC9762 Space Mission Development	Introduced	Introduced	Introduced	Introduced		Developed	Developed
ELEC9764 The Ground Segment and Space Operations	Introduced	Introduced	Introduced	Introduced	Introduced	Developed	Developed
GSOE9758 Network Systems Architecture	Developed	Proficient	Proficient	Proficient	Proficient	Developed	Proficient
TELE9751 Switching Systems Architecture	Proficient	Proficient	Proficient	Proficient	Proficient	Developed	Proficient
TELE9752 Network Operations and Control	Proficient	Proficient	Proficient	Proficient	Developed	Proficient	Proficient
TELE9753 Advanced Wireless Communications	Proficient	Developed	Developed	Proficient	Developed	Developed	Developed
TELE9754 Coding and Information Theory	Proficient	Proficient	Proficient	Proficient	Developed	Developed	Proficient
TELE9755 Microwave Circuits, Theory and Techniques	Proficient	Proficient	Proficient	Proficient	Developed	Proficient	Proficient
TELE9756 Advanced Networking	Proficient	Proficient	Developed	Developed	Proficient	Developed	Developed
TELE9757 Quantum Communications	Proficient	Proficient	Proficient	Proficient	Proficient	Developed	Developed
TELE9781 Special Topics in Telecommunications 1	Developed	Developed	Developed				
TELE9782 Special Topics in Telecommunications 2	Developed	Developed	Developed				

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, 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.

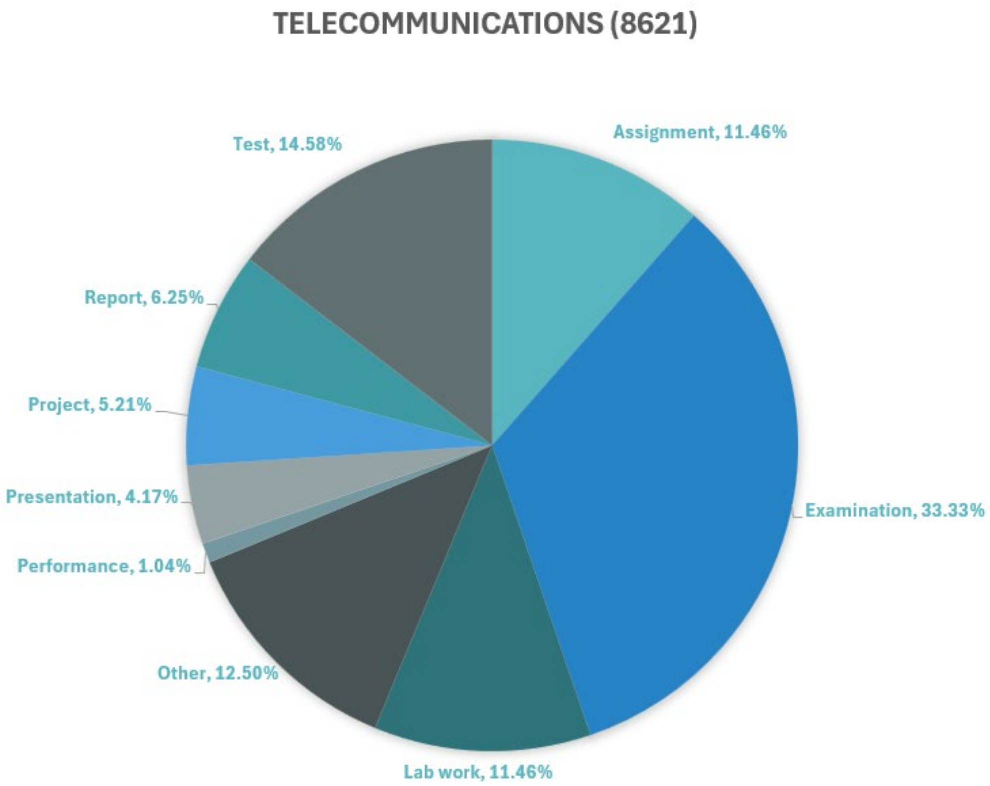

Fig. 1: Percentage of assessment types used within the specialisation.

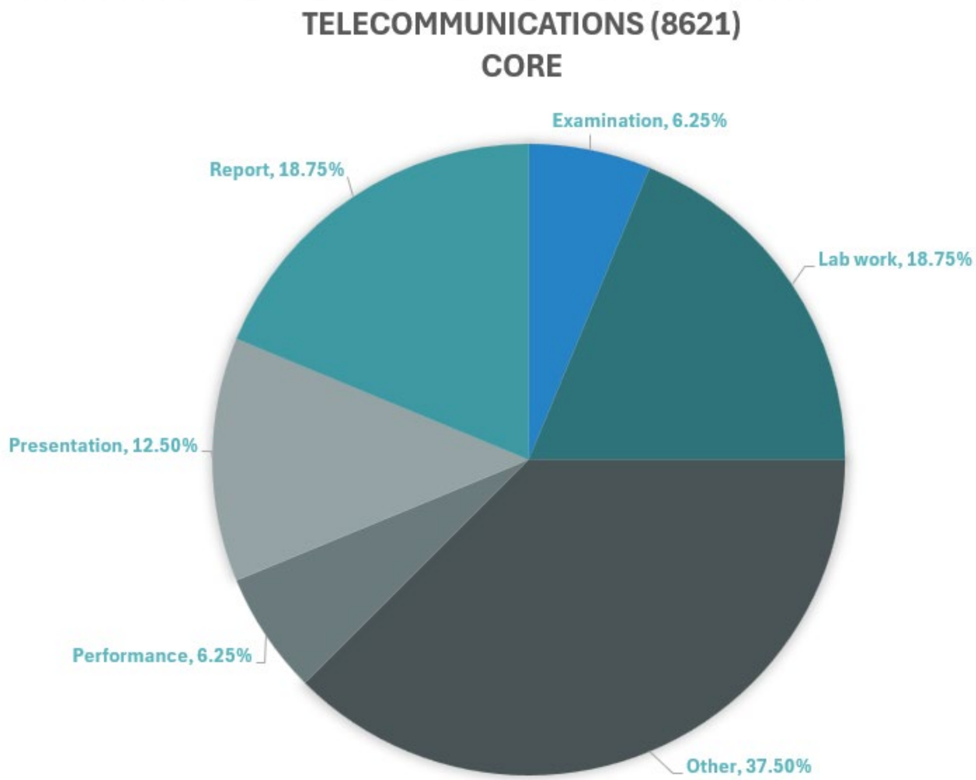

Fig. 2: Percentage of assessment types used within the core of the specialisation.

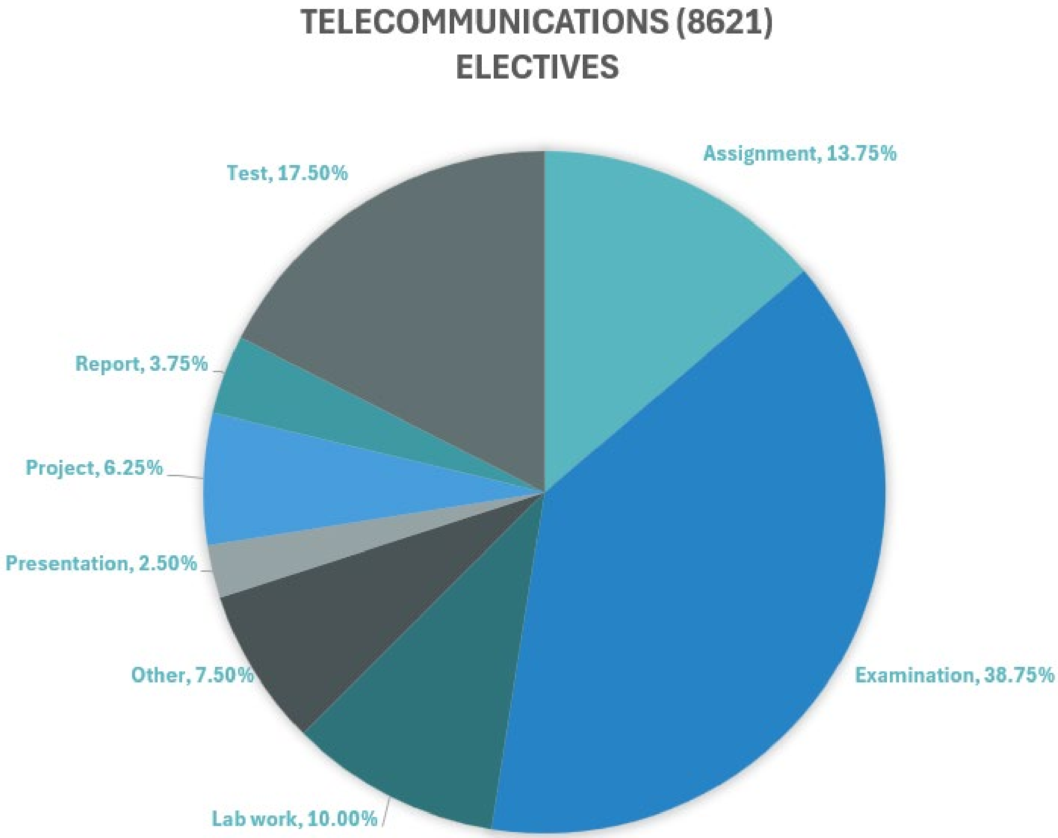

Fig. 3: Percentage of assessment types used within the electives of the specialisation.

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

To contextualize the discussion of specialisation progression plan, it is important to first outline the structure of the TELEAS8621 program. The 2-year ME program comprises 96 UoC, of which 18 UoC are core, and the remainder are electives. All students are also required to complete 60 days of Industrial Training.

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 digital modulation, wireless communication technologies, optical communication systems, satellite systems, and network performance 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 (Telecommunications 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 digital communications, wireless systems, optical networks, satellite communications, and advanced network architectures. 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