

UNSW Engineering Education Specification

1. Program Overview

Program Title: Bachelor of Engineering (Honours)

Award Title: Bachelor of Engineering (Honours) (Telecommunications)

Engineering Discipline: Telecommunications

The Bachelor of Engineering (Honours) in Telecommunications Engineering (Program Code: 3707, Plan Code: TELEAH3707) is a four-year full-time program. It is designed to equip students with a strong foundation in mathematics, physics, computing, and engineering design, followed by advanced studies in telecommunications engineering. 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:* Mastery of telecommunications engineering principles, including electronics, electromagnetics, telecommunications and networking technology, signal processing, and control.
- *Engineering Application Ability:* Capacity to apply theory to practice through laboratory work, design projects, and a capstone thesis.
- *Professional and Personal Attributes:* Development of ethical awareness, teamwork, leadership, communication, and lifelong learning skills through embedded professional practice courses and general education requirements.

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

- *Bachelor of Engineering (Honours)* indicates a four-year program with a significant research and design component, culminating in a thesis.
- *Telecommunications Engineering* specifies the discipline focus, highlighting the program's emphasis on the design, development, and management of communication systems and networks, including wireless, optical, satellite, and internet-based technologies, as well as modern signal processing and data transmission.

2. Career Alignment

TELEAH3707 equips graduates with the knowledge, skills, and professional capabilities needed to enter a wide range of telecommunications, networking, and digital-infrastructure roles across established and emerging industry sectors. The program is designed to reflect the professional expectations of Engineers Australia and broader industry requirements, enabling graduates to contribute effectively to technologically complex, safety-critical, and rapidly evolving communications environments.

2.1. Alignment with Industry Sectors and Workforce Needs

TELEAH3707 equips students with knowledge and skills relevant to major engineering sectors in Australia and internationally, including:

- **Radiofrequency (RF), Wireless, and Mobile Communications:** Courses in RF design, antenna theory, electromagnetic propagation and wireless systems prepare students for roles across 4G/5G/6G deployment, wireless network engineering, spectrum management and device-level radio systems engineering. Graduates can contribute to network design, interference management, communication system optimisation, and emerging wireless technologies such as millimetre-wave, IoT connectivity and private 5G networks.
- **Telecommunications Service Providers & Network Operators:** Graduates are prepared for roles in planning, deploying, operating and optimising large-scale communication networks (e.g., mobile networks, fibre-optic infrastructure, fixed wireless, satellite). Core study areas—such as signal processing, RF engineering, network architectures, mobile network protocols, and QoS/traffic engineering—map directly to roles in companies such as national carriers, NBN-related service providers, and enterprise network operators.
- **Internet, Cloud, and Data-Centre Infrastructure:** Training in IP networking, communications protocols, routing/switching, network security and virtualised network architectures enables graduates to work in cloud service providers, content-delivery networks, enterprise IT departments, and data-centre operations. This includes preparing graduates for roles requiring skills in SDN, NFV, network orchestration and network automation.
- **Defence, Emergency Services and Critical Infrastructure Communications:** TELEAH3707 equips graduates to support secure, resilient communications used in defence, aviation, maritime, rail, utilities and emergency-services networks. Coverage of secure communications, network reliability, encryption, redundancy planning and resilient architectures supports readiness for roles in mission-critical communications engineering.

2.2. Preparation for Emerging and High-Growth Fields

TELEAH3707 structure includes content and experiences that align with evolving telecommunications technologies and future workforce needs:

- **5G/6G, Edge Computing & Network Virtualisation:** Graduates gain foundational skills in cellular architectures, advanced modulation and transceiver designs, MIMO systems, virtualised network functions, distributed networks and real-time communication systems. These support career pathways in advanced mobile network engineering, future-network research, and digital-infrastructure modernisation.
- **Internet of Things (IoT) and Cyber-Physical Systems:** Students learn the protocols, embedded communication methods and low-power network technologies that underpin IoT ecosystems. This is relevant for smart cities, intelligent transport systems, industrial automation and environmental monitoring.
- **Satellites, Space Communications and Remote Connectivity:** The program's focus on radio communications, propagation, orbital considerations and link-budget design enables graduates to

work within Australia's rapidly expanding space-technology sector. This includes satellite communications, earth-observation network integration, and remote-area broadband.

- **Cybersecurity for Networked Systems:** Graduates develop capabilities in secure network design, threat modelling, encryption, authentication protocols and risk minimisation in communication systems. This aligns with the increasing requirement for engineers who can design secure digital infrastructure and protect communications assets.

2.3. Professional Expectations and EA Stage 1 Competency Alignment

TELEAH3707 embeds learning outcomes and experiences that reflect industry norms and Engineers Australia's expectations for graduate engineers:

- **Technical Competence (EA Knowledge & Skills):** Students acquire comprehensive knowledge of communication theory, information theory and digital signal processing; RF, microwave, satellite and optical communication systems; IP networking, protocols, routing, switching and network performance; telecommunications standards, spectrum regulations and compliance; network modelling, simulation, measurement and optimisation tools. These abilities equip graduates for roles such as telecommunications engineers, radio engineers, network planners, network operations engineers, and systems engineers.
- **Systems Integration and Engineering Practice (EA Application Ability):** Across design projects, laboratories and industry-aligned tasks, students analyse complex communication problems and propose effective designs; integrate hardware, software and network-layer solutions; apply industry standards (e.g., ITU-T, 3GPP, IEEE, ACMA guidelines); consider safety, resilience, interoperability and lifecycle requirements. Such preparation aligns with careers in ISP operations, mobile-network design, network security, systems integration and communication-equipment engineering.
- **Professional and Personal Capabilities (EA Professional & Personal Skills):** Students gain experience through team-based projects, technical communication tasks, design reports, industry-focused case studies and workplace-simulated activities. These build effective communication with technical and non-technical stakeholders; project management and documentation competencies; ethical and regulatory awareness (privacy, safety, cybersecurity, spectrum use); readiness to contribute to multidisciplinary engineering teams. These skills support career progression into project engineering, network planning, consultancy, technical leadership and engineering management roles.

2.4. Typical Career Pathways

TELEAH3707 graduates commonly progress into roles such as:

- Telecommunications Engineer
- Network Design Engineer
- RF / Wireless Engineer
- 5G/6G Systems Engineer
- Network Operations Centre Engineer
- Satellite and Space Communications Engineer
- IoT Systems Engineer
- Cybersecurity / Network Security Engineer
- Systems Integration Engineer
- Communications Infrastructure Engineer

- Telecommunications Project Engineer

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:

- SL01.** Demonstrate a rigorous understanding of the fundamental principles embodied in Telecommunications Engineering.
- SL02.** Identify, select, and apply specialist in-depth technical knowledge and current research, in electronics, signal processing, telecommunications and networking technology.
- SL03.** Think independently, critically, logically and apply analytical procedures and tools to develop complex hardware and software telecommunication systems and networks.
- SL04.** Proficiently apply problem-solving and design skills to demanding, open-ended telecommunication design challenges.
- SL05.** Demonstrate a professional attitude concerning the role of engineers in society and a well-developed, responsible ethic including safety and environmental concerns.
- SL06.** Communicate technical and non-technical concepts fluently and effectively to all audiences, whether as part of a project team or in a leadership context.

The knowledge base developed in SL01 directly supports the Stage 1 competency requirement for a sound and comprehensive grasp of underpinning engineering sciences. SL02 ensures graduates can apply advanced technical knowledge to practical engineering problems, meeting the competency in engineering application ability. The analytical and problem-solving skills in SL03 reflect professional trends towards innovation and adaptability in modern telecommunications engineering practice. SL04 demonstrates attainment of competencies in creativity, design innovation, and the ability to manage complex projects. The professional attitude and ethical responsibility highlighted in SL05 align with industry and community needs for socially responsible engineers committed to sustainable practice. Finally, SL06 ensures graduates meet the competencies in professional and personal attributes, becoming effective communicators and collaborators in multidisciplinary environments.

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 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. Thesis 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. 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 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 5G/6G mobile communications, optical fibre systems, satellite communications, IoT connectivity, cybersecurity, and digital transformation. In this AI era, the program is regularly benchmarked against international standards and professional trends, ensuring that graduates remain competitive in global telecommunications engineering markets.

Through these mechanisms, the 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 telecommunications engineering practice.

5. Review Process

5.1. Faculty-led Review

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 (TELEAH3707) of the 3707 Bachelor of Engineering (Honours) 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, 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 TELEAH3707 specialisation has been compiled.

An Excel-based mapping tool—developed specifically for mapping the CLOs of all core and elective courses in the TELEAH specialisation to the six 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 consisting of Deputy Head of School Education, Director of UG Academic studies, Director of PG Academic studies, and Deputy Director of PG Academic Studies. Table 2 shows screenshot of the completed CLO-SLO mapping for some example courses .

The mapping of PLOs (the 16 EA's Stage 1 Elements of Competency PE1.1, PE1.2,...PE3.5, PE3.6) to sub-SLOs and then to CLOs with quantified attainment (counts of introduced, developed, proficient) is generated. The generation of this heatmap is based on the existing SLOs to PLOs mapping, which is shown in Table 1.



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 rigorous understanding of the fundamental principles embodied in Telecommunications Engineering.	x	x	x				x									
2. Identify, select, and apply specialist in-depth technical knowledge and current research, in electronics, signal processing, telecommunications and networking technology.			x	x			x									
3. Think independently, critically, logically and apply analytical procedures and tools to develop complex hardware and software telecommunication systems and networks.			x		x		x	x	x							
4. Proficiently apply problem-solving and design skills to demanding, open ended telecommunication design challenges.						x	x	x	x					x		
5. Demonstrate a professional attitude concerning the role of engineers in society and a well-developed, responsible ethic including safety and environmental concerns.					x	x				x	x		x	x	x	x
6. Communicate technical and non-technical concepts fluently and effectively to all audiences, whether as part of a project team or in a leadership context.				x						x		x	x		x	x

NOTE: ^{PL01}Comprehensive theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering; ^{PL02} Conceptual understanding of the mathematics, numerical analysis, statistics and computer and information sciences which underpin the engineering discipline; ^{PL03} In-depth understanding of specialist bodies of knowledge within the engineering discipline; ^{PL04} Discernment of knowledge development and research directions within the engineering discipline; ^{PL05} Knowledge of engineering design practice and contextual factors impacting the engineering discipline; ^{PL06} Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice; ^{PL07} Application of established engineering methods to complex engineering problem solving; ^{PL08} Fluent application of engineering techniques, tools and resources; ^{PL09} Application of systematic engineering synthesis and design processes; ^{PL010} Application of systematic approaches to the conduct and management of engineering projects; ^{PL011} Ethical conduct and professional accountability; ^{PL012} Effective oral and written communication in professional and lay domains; ^{PL013} Creative, innovative and pro-active demeanour; ^{PL014} Professional use and management of information; ^{PL015} Orderly management of self and professional conduct; ^{PL016} Effective team membership and team leadership.

Table 2. Completed CLO-SLO mapping.

Course/SLO	1. Demonstrate a rigorous understanding of the fundamental principles embodied in Telecommunications Engineering.	2. Identify, select, and apply specialist in-depth technical knowledge and current research, in electronics, signal processing, telecommunications and networking technology.	3. Think independently, critically, logically and apply analytical procedures and tools to develop complex hardware and software telecommunication systems and networks.	4. Proficiently apply problem-solving and design skills to demanding, open-ended telecommunication design challenges.	5. Demonstrate a professional attitude concerning the role of engineers in society and a well-developed, responsible ethic including safety and environmental concerns.	6. Communicate technical and non-technical concepts fluently and effectively to all audiences, whether as part of a project team or in a leadership context.
Level 1 Core Courses						
COMP1511 Programming Fundamentals	Introduced					
COMP1521 Computer Systems Fundamentals	Introduced					
COMP1911 Computing 1A	Developed					
DESN1000 Introduction to Engineering Design and Innovation	Introduced	Introduced	Developed	Developed	Developed	Developed
ELEC1111 Electrical Circuit Fundamentals	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced
MATH1131 Mathematics 1A	Developed		Introduced			Introduced
MATH1141 Higher Mathematics 1A	Developed		Introduced			Introduced
MATH1231 Mathematics 1B	Developed		Introduced			Introduced
MATH1241 Higher Mathematics 1B	Developed		Introduced			Introduced
PHYS1121 Physics 1A	Introduced					
PHYS1131 Higher Physics 1A	Introduced					
PHYS1231 Higher Physics 1B	Introduced					
Level 2 Core Courses						
DESN2000 Engineering Design and Professional Practice	Developed	Developed	Introduced	Introduced	Introduced	Developed
ELEC2133 Analogue Electronics	Developed	Developed	Developed	Introduced	Introduced	Introduced
ELEC2134 Circuits and Signals	Developed	Developed	Developed	Introduced		Introduced
ELEC2141 Digital Circuit Design	Developed	Developed				
MATH2069 Mathematics 2A	Developed					
MATH2099 Mathematics 2B	Developed					
Level 3 Core Courses						
ELEC3104 Digital Signal Processing	Developed	Developed	Developed	Developed		Proficient

ELEC3106 Electronics	Developed	Developed	Developed	Developed		Developed
ELEC3114 Control Systems	Developed	Developed				Developed
ELEC3115 Electromagnetic Engineering	Developed	Developed	Introduced	Introduced	Introduced	Introduced
ELEC3117 Electrical Engineering Design	Proficient	Proficient	Proficient	Developed	Proficient	Proficient
TELE3113 Analogue and Digital Communications	Proficient	Developed	Developed	Developed		Introduced
TELE3118 Network Technologies	Proficient	Developed	Proficient	Proficient	Developed	Developed
Level 4 Core Courses						
ELEC4122 Strategic Leadership and Ethics					Proficient	Proficient
ELEC4123 Electrical Design Proficiency	Proficient	Developed	Proficient	Proficient	Developed	Proficient
ELEC4951 Research Thesis A		Proficient	Proficient	Proficient	Proficient	Proficient
ELEC4952 Research Thesis B		Proficient	Proficient	Proficient	Proficient	Proficient
ELEC4953 Research Thesis C		Proficient	Proficient	Proficient	Proficient	Proficient
TELE4641 Network Security and Privacy	Proficient	Developed	Proficient	Proficient	Developed	Developed
Breadth Electives						
COMP2041 Software Construction: Techniques and Tools	Developed					Developed
COMP3211 Computer Architecture	Proficient		Developed			Developed
COMP3231 Operating Systems	Proficient					
ELEC3105 Electrical Energy	Developed	Developed	Developed	Introduced	Introduced	Introduced
ELEC3111 Distributed Energy Generation					Introduced	Introduced
ELEC3145 Real Time Instrumentation	Developed	Introduced	Introduced			Introduced
ELEC3146 Electrical Engineering Modelling and Simulation	Developed	Developed	Developed	Developed		
ELEC3705 Fundamentals of Quantum Engineering	Developed	Developed	Developed			
ENGG2600 Engineering Vertically Integrated Project		Introduced	Introduced	Introduced	Introduced	Introduced
ENGG3001 Fundamentals of Humanitarian Engineering	Introduced	Introduced	Introduced		Developed	Developed
ENGG3060 Rehabilitation and Assistive Technology	Introduced	Introduced	Introduced	Developed	Developed	Developed
ENGG3600 Engineering Vertically Integrated Project		Developed	Developed	Developed	Developed	Developed
ENGG4060 Student Initiated Project			Developed	Developed	Developed	Developed
ENGG4102 Humanitarian Engineering Project		Developed	Developed	Developed	Developed	Developed
ENGG4600 Engineering Vertically Integrated Project		Proficient	Proficient	Proficient	Proficient	Proficient
MATH3101 Computational Mathematics for Science and Engineering	Proficient					

MATH3121 Mathematical Methods and Partial Differential Equations	Proficient					Developed
MATH3161 Optimization	Proficient		Developed			Developed
MATH3201 Dynamical Systems and Chaos	Proficient					Developed
MATH3261 Fluids, Oceans and Climate	Proficient					Developed
MATH3411 Information, Codes and Ciphers	Developed					
Discipline (Depth) Electives						
ELEC4445 Entrepreneurial Engineering					Proficient	Developed
ELEC4601 Digital and Embedded Systems Design	Proficient	Proficient	Proficient	Developed	Developed	Developed
ELEC4602 Microelectronic Design and Technology	Proficient	Proficient	Proficient	Proficient		Proficient
ELEC4603 Solid State Electronics	Developed	Developed	Introduced	Introduced	Introduced	Developed
ELEC4605 Quantum Devices and Computers	Proficient	Proficient	Proficient	Proficient		Developed
ELEC4611 Power System Equipment					Introduced	Developed
ELEC4612 Power System Analysis					Developed	Developed
ELEC4613 Electrical Drive Systems	Developed	Introduced	Developed	Developed	Introduced	Developed
ELEC4614 Power Electronics	Introduced	Proficient	Proficient	Developed	Introduced	Introduced
ELEC4617 Power System Protection					Introduced	
ELEC4621 Advanced Digital Signal Processing	Proficient	Proficient	Proficient			Developed
ELEC4622 Multimedia Signal Processing	Proficient	Proficient	Developed	Developed		Introduced
ELEC4623 Biomedical Instrumentation, Measurement and Design		Proficient	Proficient	Proficient	Developed	
ELEC4631 Continuous - Time Control System Design	Developed	Developed	Developed	Developed	Developed	Developed
ELEC4632 Computer Control Systems	Proficient	Proficient	Proficient	Proficient	Introduced	Introduced
PHTN4661 Optical Circuits and Fibres	Developed	Developed	Developed	Developed		Introduced
PHTN4662 Photonic Networks	Developed	Developed	Developed	Developed		Developed
TELE4642 Network Performance	Proficient	Proficient	Proficient	Proficient	Developed	Developed
TELE4651 Wireless Communication Technologies	Proficient	Proficient	Developed	Proficient	Proficient	Developed
TELE4652 Mobile and Satellite Communications Systems	Proficient	Proficient	Proficient	Proficient	Introduced	Introduced
TELE4653 Digital Modulation and Coding	Proficient	Proficient	Developed	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 specialisations, early courses are content-driven and the assessments reflect a desire to see demonstration of individual learning in tests or examinations. Students commonly have opportunities for longer-form formative or summative assignment activities. In later years, the assessment mix tends to pivot towards project work, often in teams.

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”.

TELECOMMUNICATIONS

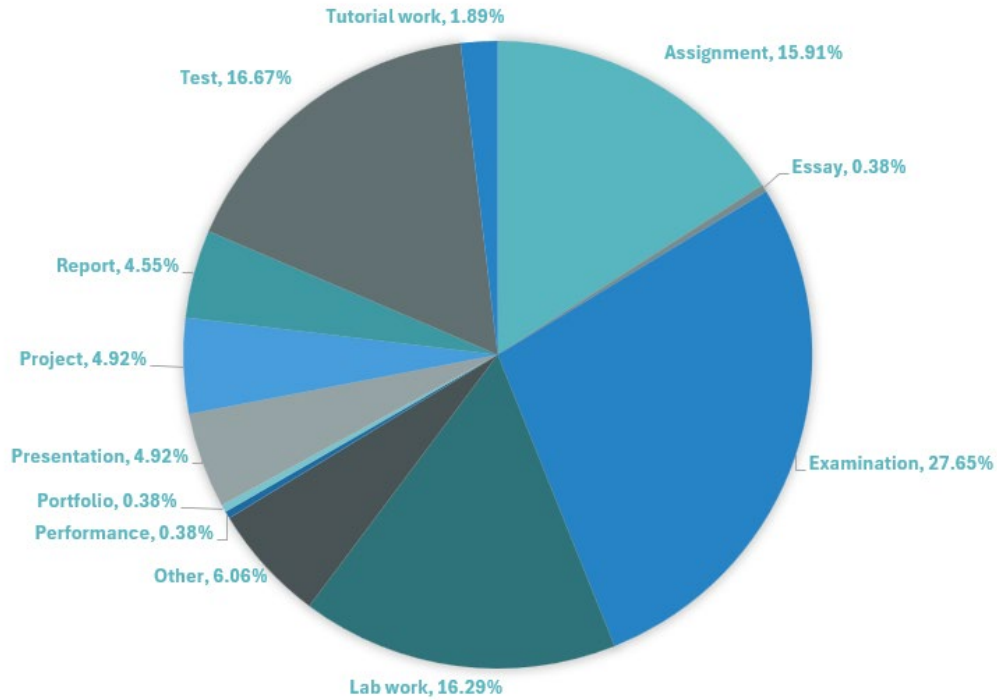


Fig. 1: Percentage of assessment types used within the specialisation.

TELECOMMUNICATIONS CORE

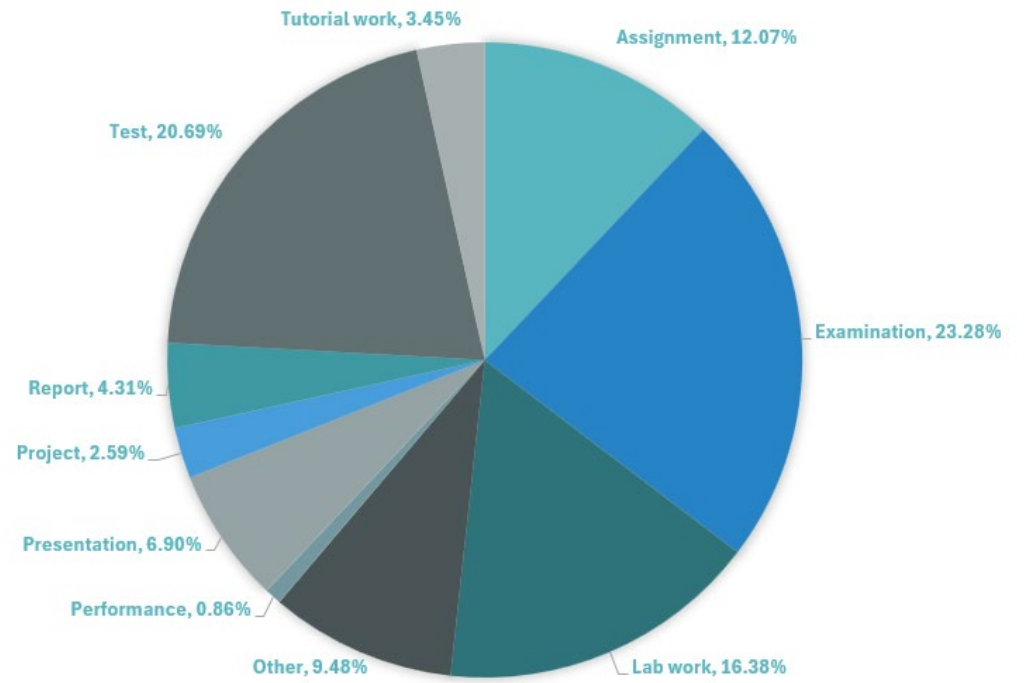


Fig. 2: Percentage of assessment types used within the core of the specialisation.

TELECOMMUNICATIONS ELECTIVES

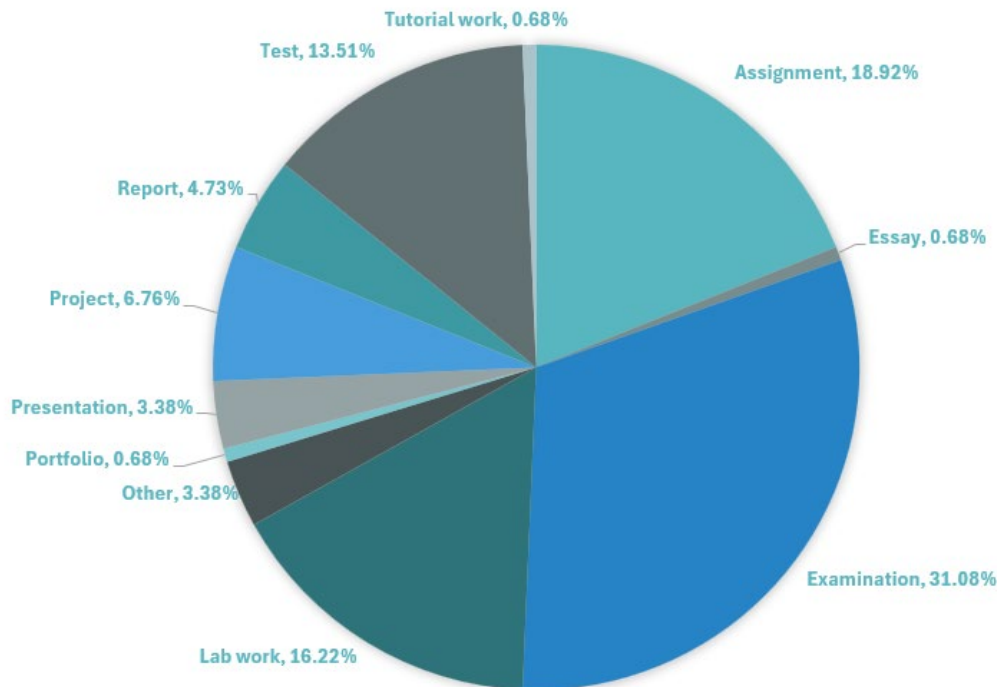


Fig. 3: Percentage of assessment types used within the electives of the specialisation.

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 outcomes, 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 telecommunications 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 an 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. Capstone design projects, industry placements, and integrative courses such as ELEC4123 – 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 in telecommunications engineering and continue to support the development of capable, work-ready graduates.

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. In some courses, students complete self-marking exercises at key milestones, comparing their perceived competence with instructor feedback – this is the case for the self-marking task performed for the mid-term examination in the early year courses. This triangulated approach fosters metacognitive awareness and empowers students to take ownership of their learning journey.

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 problem-solving, communication, teamwork, and ethical responsibility. In the telecommunications specialisation, these reflections often focus on projects involving network design, wireless communications, optical fibre systems, IoT applications, and cybersecurity, ensuring students critically engage with industry-relevant standards and practices. 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.

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 telecommunications 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.

Some specific examples of how students are instructed to use generative AI are as follows: In some courses generative AI may be used for drafting or coding support, but all use must be explicitly acknowledged. Integrity is safeguarded through oral presentations, lab demonstrations, and iterative submissions that confirm student ownership of work. In other courses AI can assist with background research or brainstorming, but students must critically reflect on its reliability and ethical implications. This ensures independent judgment and alignment with professional responsibility standards.

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.

Years 1–2: Building Foundations for Independent Learning

In the early years, students engage with structured learning environments that introduce core engineering principles while encouraging self-directed inquiry. Students use reflective learning through structured feedback during laboratory evaluations and self-marking of the mid-term exam. This course begins the transition from guided instruction to independent exploration. Progression plans at this stage emphasise the acquisition of core knowledge and the initial development of reflective practice, enabling students to track their movement from guided learning to independent inquiry.

Years 2–3: Developing Critical Review and Reflective Practice

As students progress, the curriculum emphasises deeper engagement with complex engineering problems and critical evaluation. Courses will foster critical review and reflective practice by requiring students to analyse and compare circuit models, evaluate simulation results against theory, and reflect

on laboratory outcomes to identify errors and improvements. Through iterative problem solving, feedback, and progressive learning, the course develops students' ability to critically assess their own work and learning trajectory.

Students evaluate alternative technical solutions against performance, cost, safety, and sustainability criteria, while reflecting on their own contributions and professional responsibilities in team-based design projects. Iterative design cycles, structured feedback, and engagement with industry standards require students to critically assess decisions and refine approaches, thereby strengthening judgment and self-assessment.

These experiences enhance students' ability to critically assess their own work and that of peers, while refining their technical judgment. Progression plans during this stage highlight the transition from foundational knowledge to advanced analytical and design capabilities, ensuring students can see and document their growth in problem-solving and reflective practice.

Year 4: Capstone and Professional Autonomy

The final year focuses on synthesizing technical knowledge with independent project execution. 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, integrating evidence from capstone projects, thesis work, and leadership courses. 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.

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](#)